Universitatea
din București

Metode de dezvoltare software

Arhitecturi software
- câteva exemple -

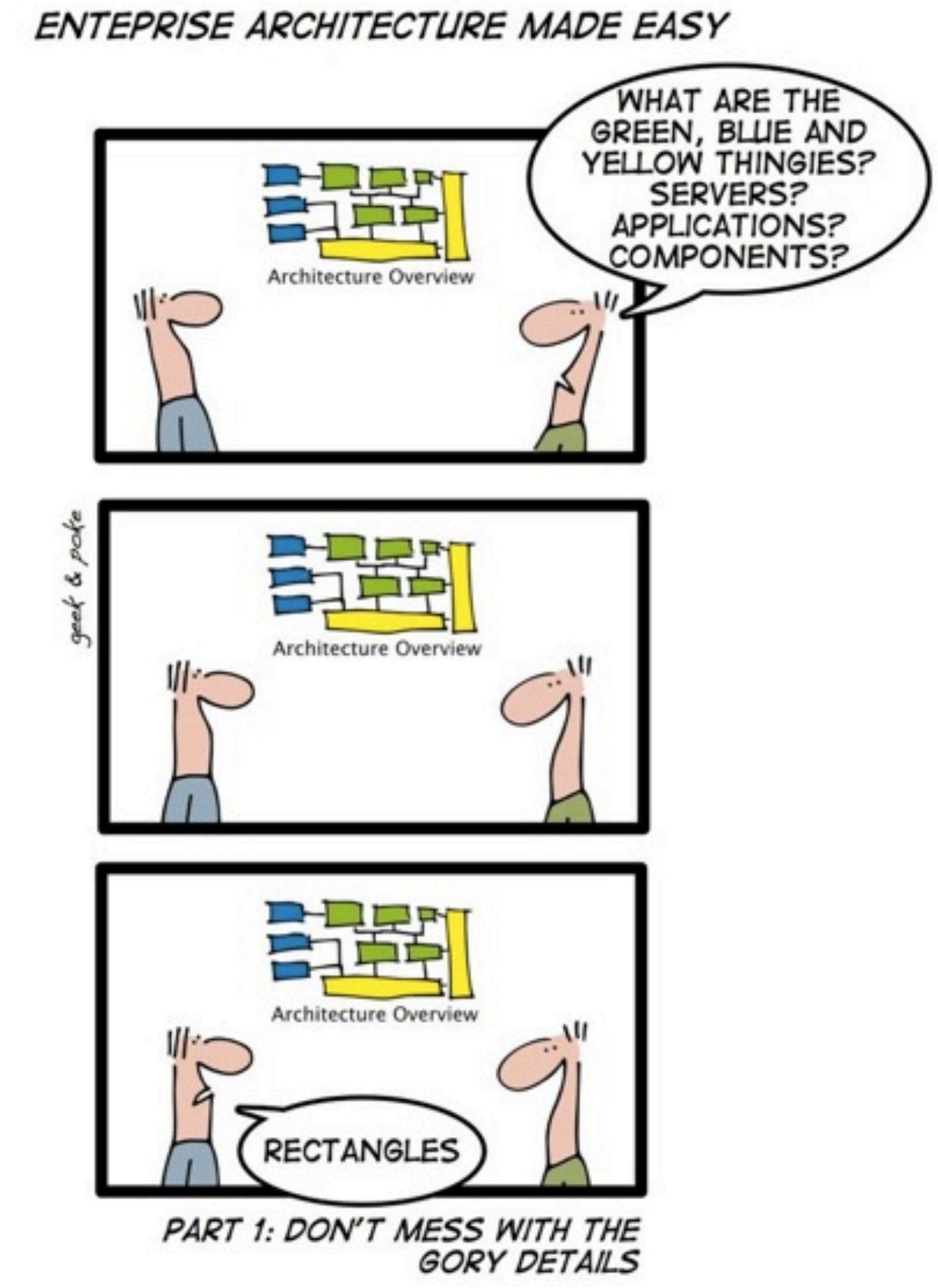
12.03.2018

Alin Ștefănescu

Arhitecturi software

de la wikipedia.org

Arhitecturi software… în practică



Arhitectura unui sistem

- Arhitectura software este un subdomeniu important al ingineriei software
- Aceasta reprezintă **împărțirea optimă a unui sistem complex în diverse componente, evidențiind relațiile dintre acestea**.
- este esențială pentru a avea un sistem funcțional și scalabil
- de știut: jobul de ”arhitect software” este bine văzut și bine plătit: https://www.glassdoor.com/List/Highest-Paying-Jobs-LST_KQ0,19.htm

Diverse atribute de calitate

Arhitectura unui sistem trebuie adaptată la atributele de calitate cerute: De exemplu:

- **performanță**: trebuie paralelizat cât mai mult, descompunând sistemul în procese cooperante; trebuie ținute sub control comunicarea și accesul la date
- **precizie:** trebuie optimizată structura datelor și modul în care valorile sunt prelucrate
- **securitate**: trebuie gestionate bine restricțiile de comunicare și acces; trebuie analizate componentele cele mai vulnerabile
- **portabilitate și reutilizare**: trebuie minimizate depedențele puternice între componente.

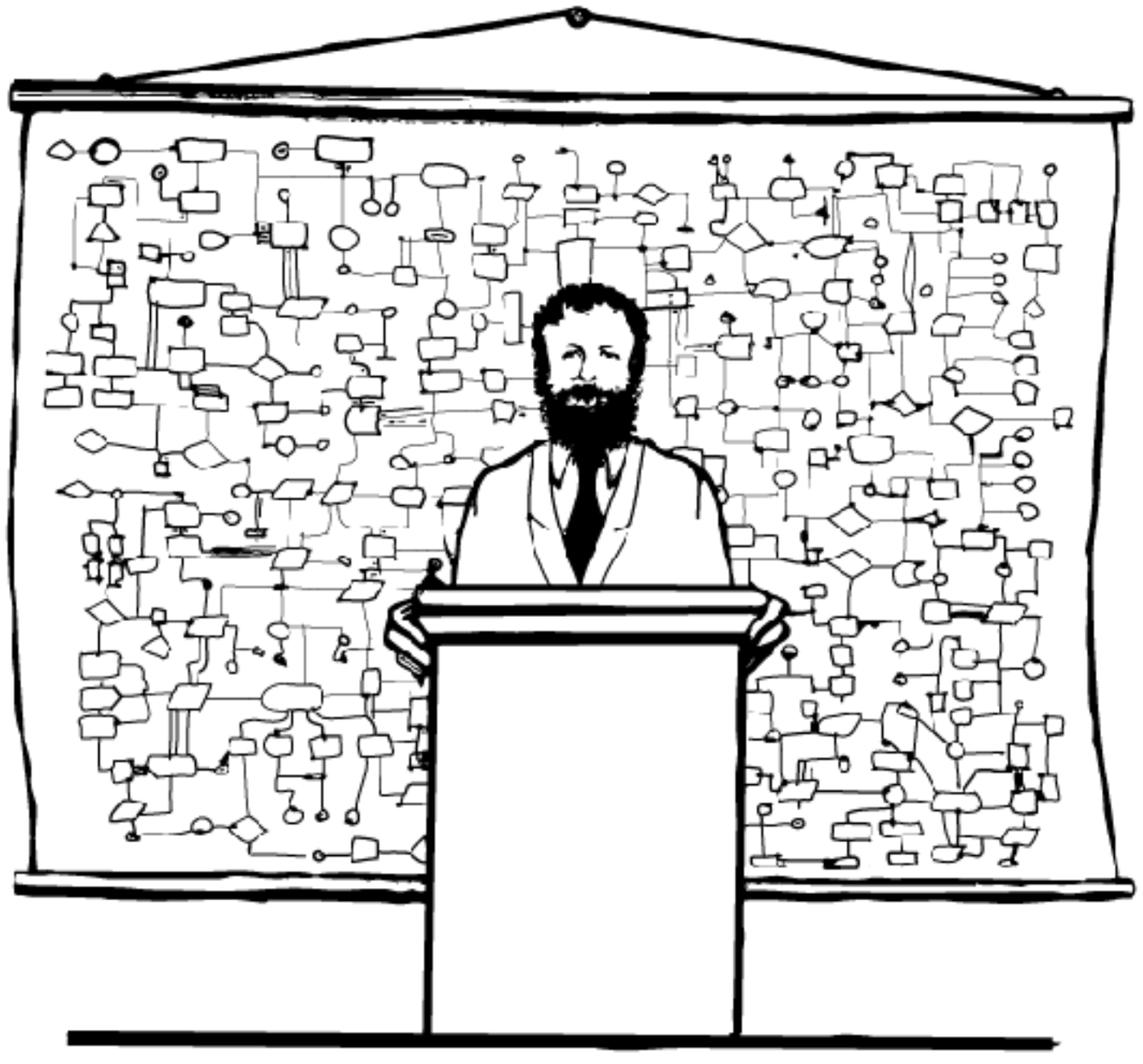
Stiluri și perspective arhitecturale

- Arhitectura software de obicei prezintă anumite **perspective** ale sistemului, de obicei părțile cele mai importante

- Exemple de perspective:
  - proces
  - data flow
  - comportament
  - deployment
  - relații între module
  - etc.

Exemple….

- în continuare, prezint câteva exemple de arhitecturi cu care am lucrat eu, iar apoi și alte exemple



"Now that you have an overview of the system, we're ready for a little more detail"

Exemplul 1 - din domeniul Business Software (SAP)

SAP is the world's leading business software company

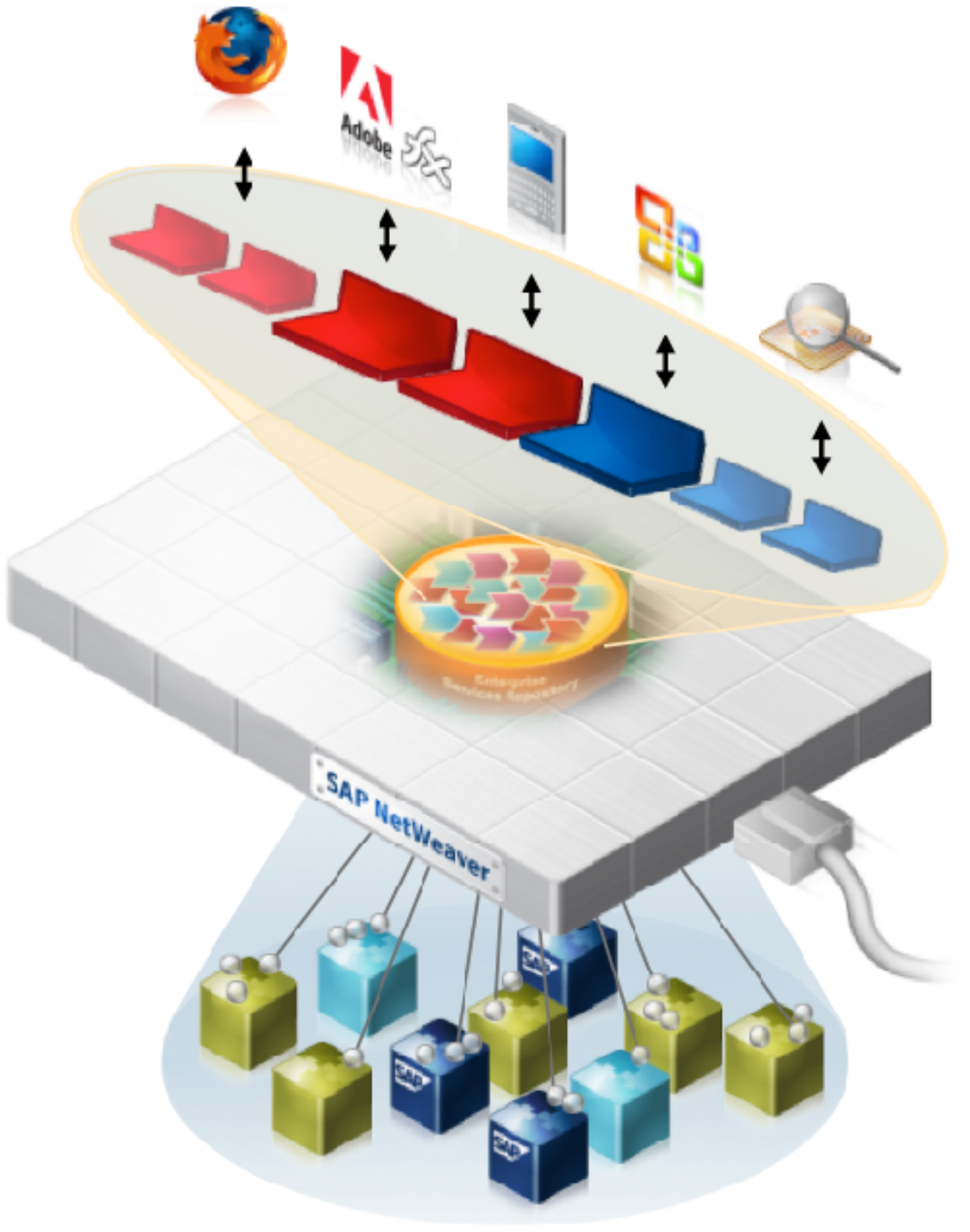
SAP is

- **#1** in enterprise applications
- **#1** in SME applications
- **#1** in business analytics
- **#1** in enterprise mobility

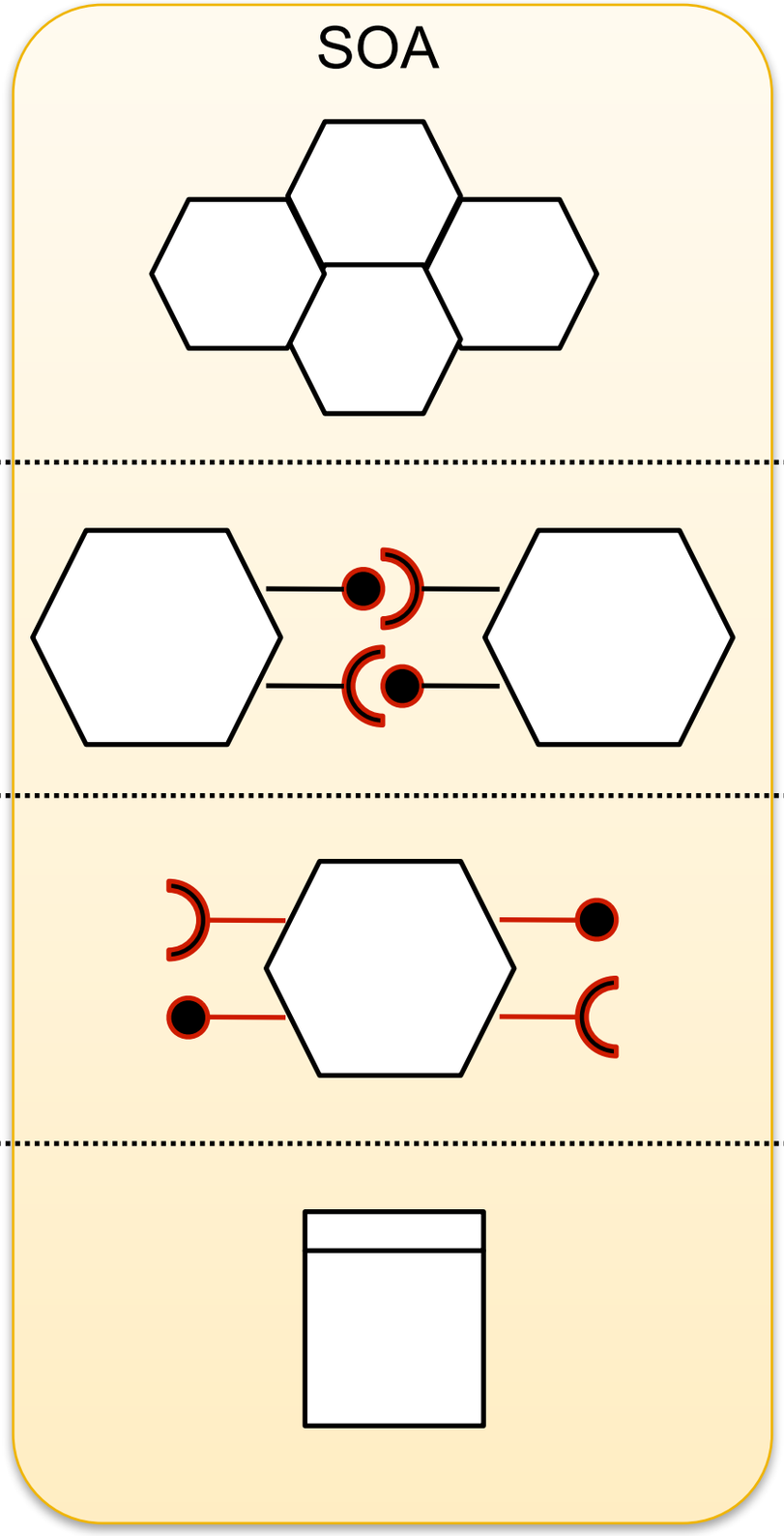
Sisteme ERP (Enterprise Resource Planning)

	3rd party Services			
Analytics	Strategic Enterprise Management	Financial Analytics	Operations Analytics	Workforce Analytics
Financials	Corporate Governance	Financial Accounting	Management Accounting	Financial Supply Chain Management
Human Capital Management	Employee Relationship Management	Employee Lifecycle Management	Employee Transaction Management	Workforce Deployment
Operations: Value Generation	Purchasing	Inventory Management	Manufacturing	Distribution	Sales Order Management	Service Order Management
Operations: Support	Product Structure Management	Project Management	Quality Management	Asset Management
Corporate Services	Travel Management	Environment, Health & Safety	Incentive & Commission Management	Real Estate Management
Solution and Integration Platform	People Integration	Information Integration	Process Integration	Application Platform

Stiva SOA (Service-oriented Architecture) la SAP



Niveluri SOA



Scenariu integrând
mai multe componente

Integrare a
componentelor

Funcționalității oferită
prin **servicii**

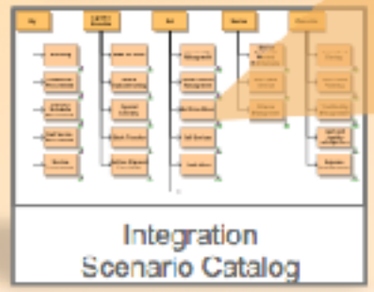
Dezvoltare
funcționalitate

Modelare SOA la SAP

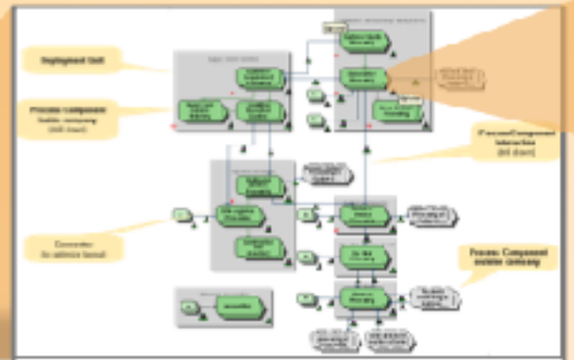
Process Integration Models (in ARIS/ESR)

Business Scope (in Excel)

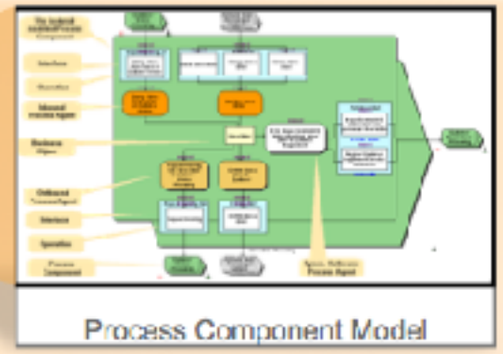
BO Map



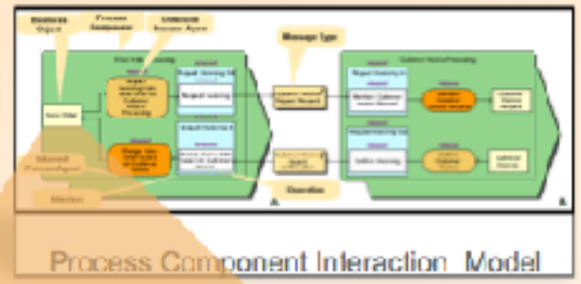
Integration Scenario Catalog



Integration Scenario Model

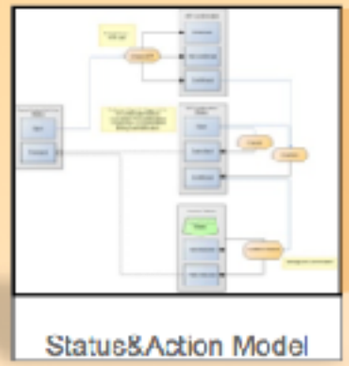


Process Component Model

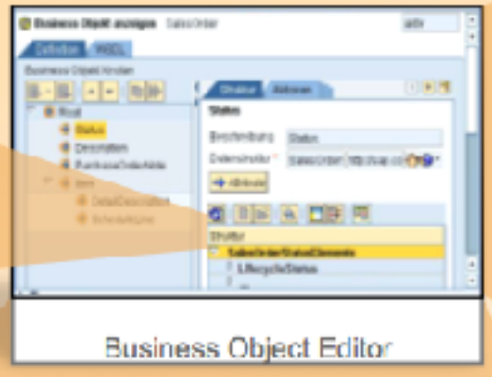


Process Component Interaction Model

Business Object Models (in ESR)

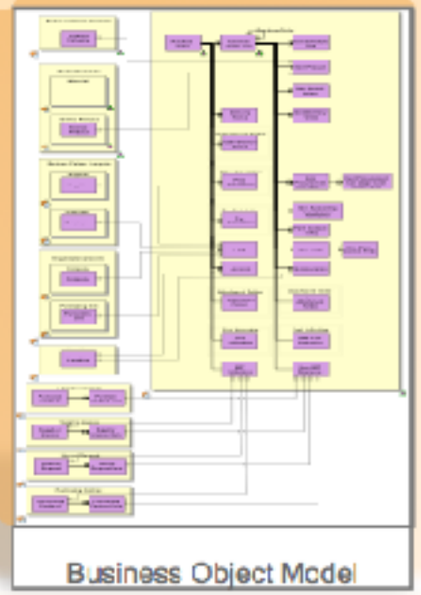


Status&Action Model



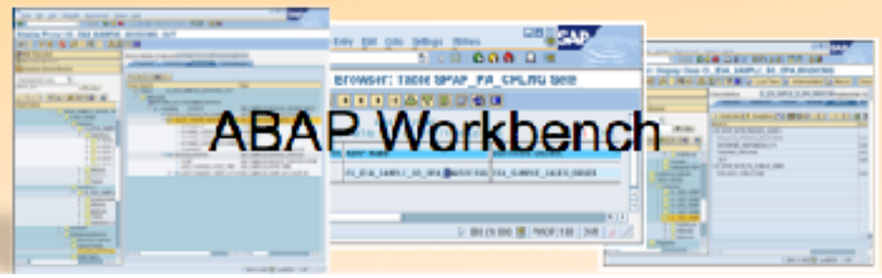
Business Object Editor

Proxy generation
in backend system

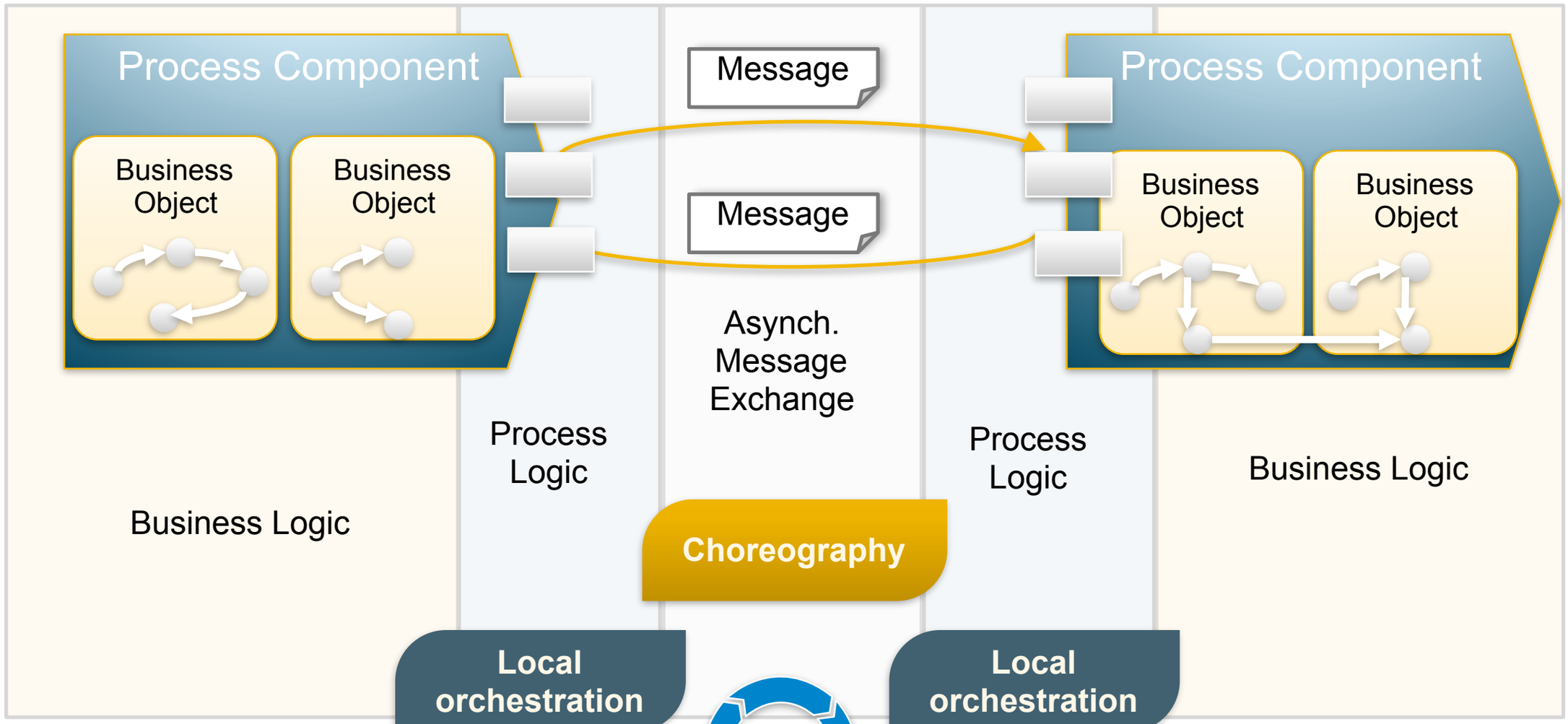


Business Object Model

Implementation

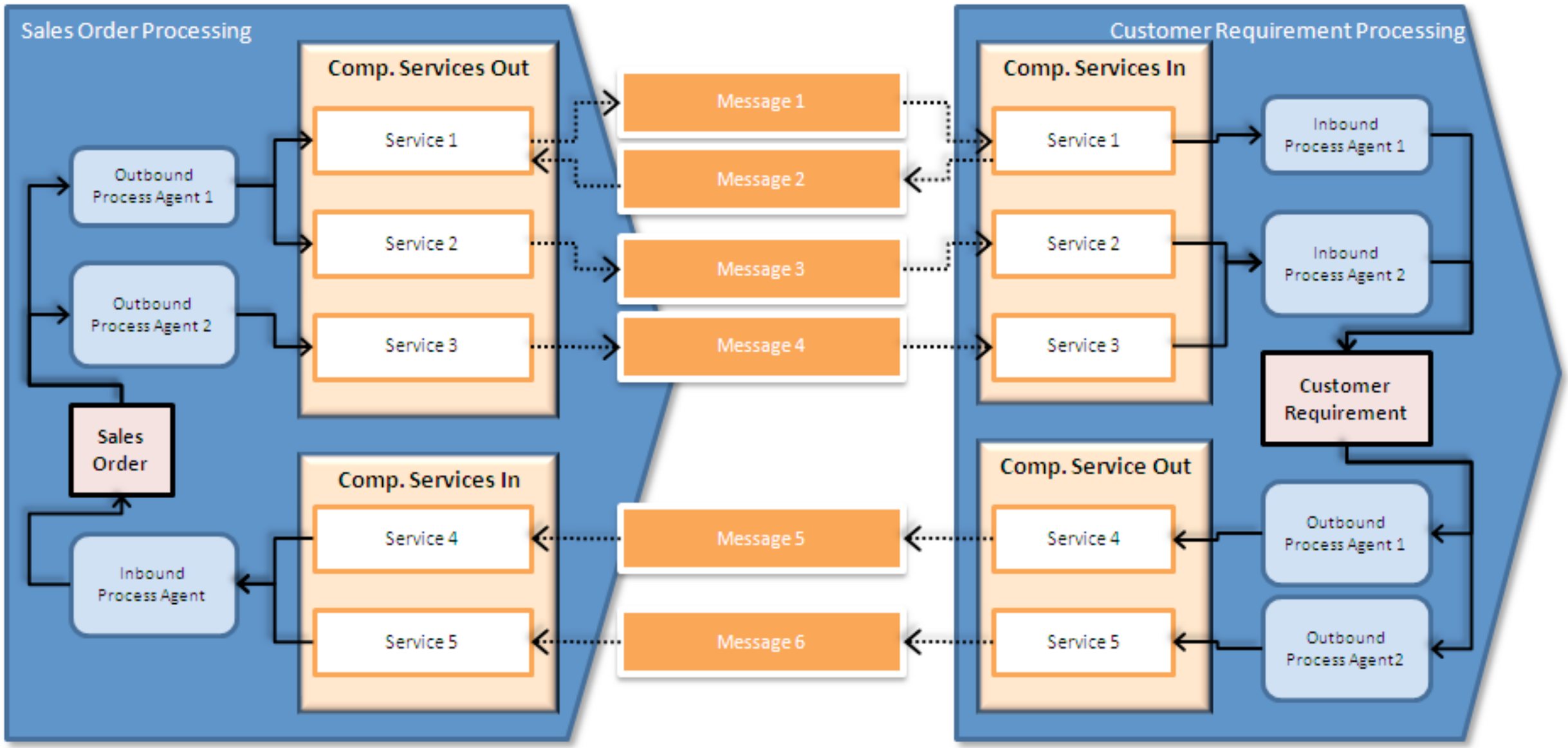


Comunicare între componente bazată pe mesaje

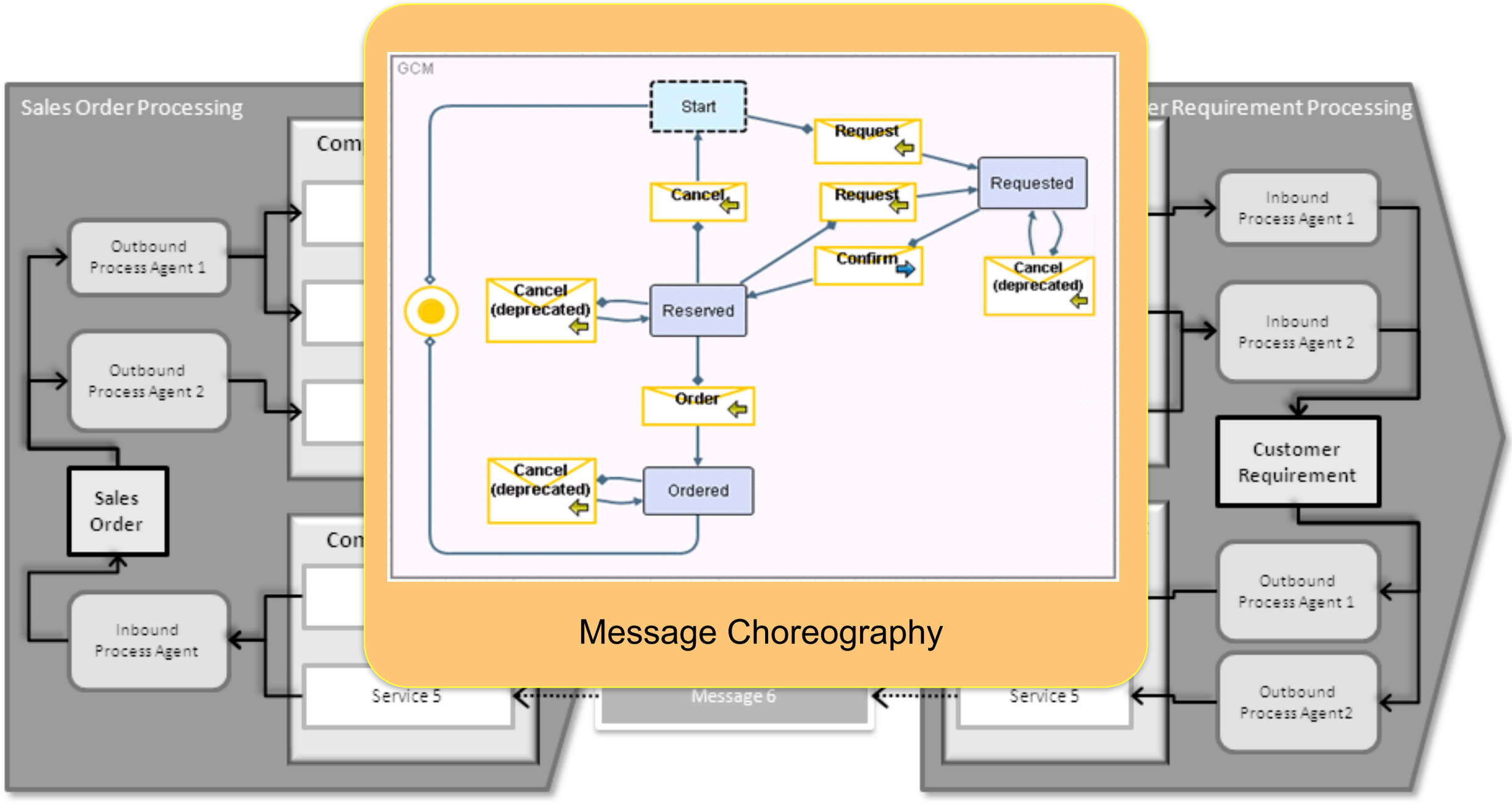


Modele de interacție între componente

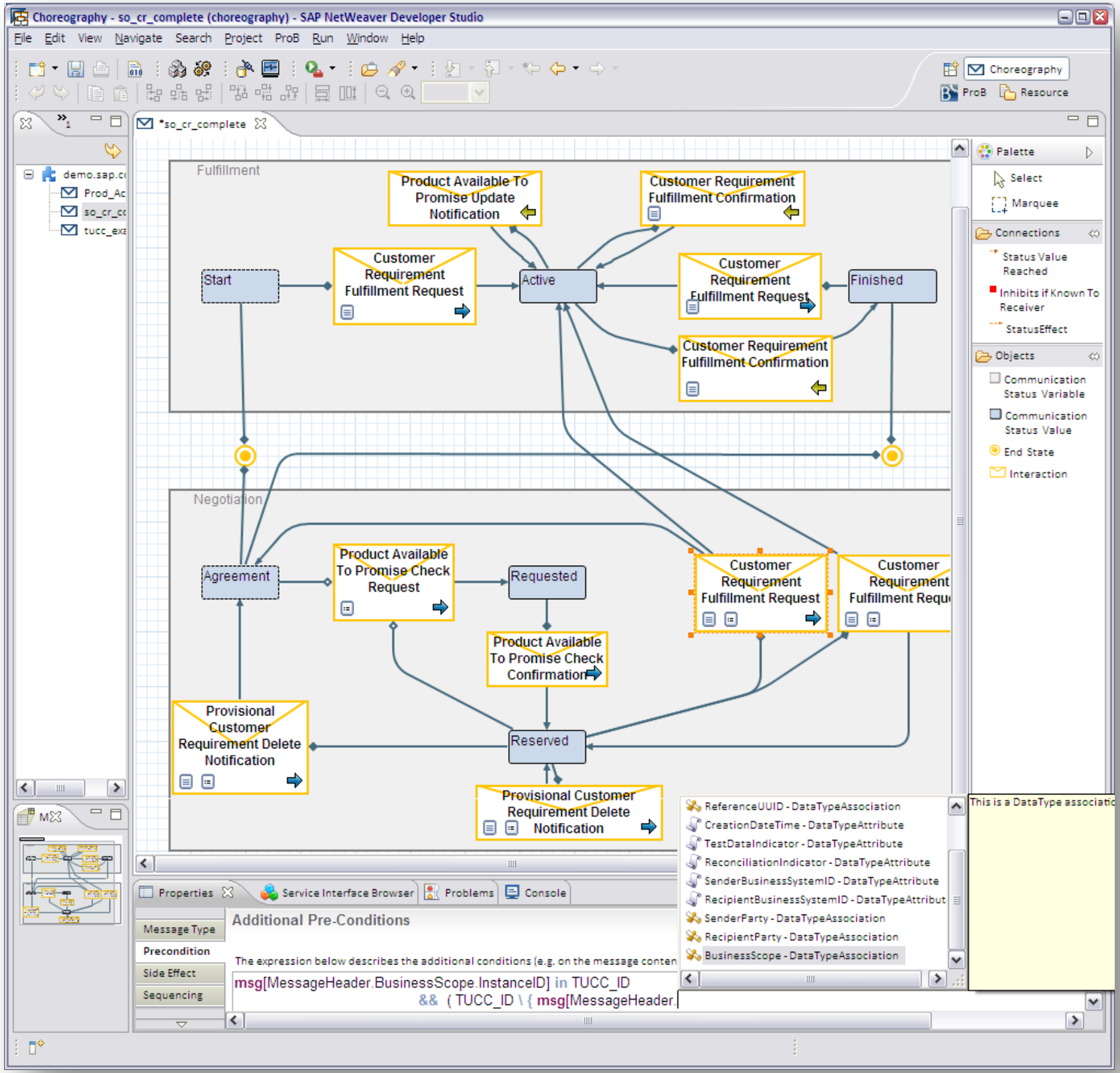
- comunicare bazată pe schimb de mesaje
- descriu doar canalele de comunicație și tipul lor



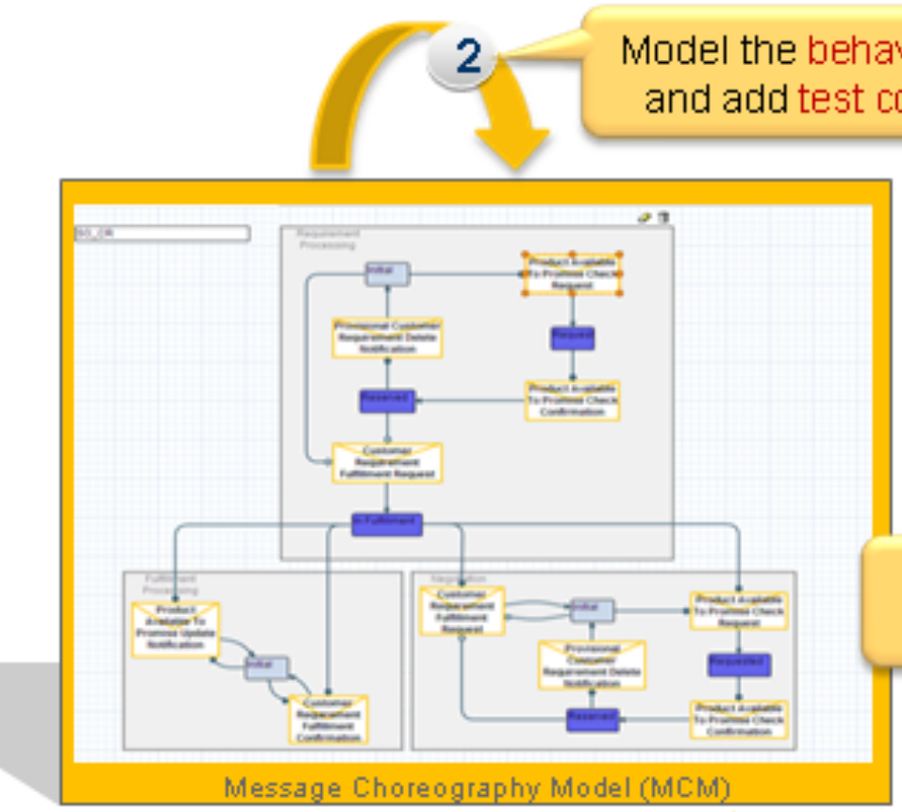
Model pentru coreografie de mesaje



Editor pentru modele de coreografii

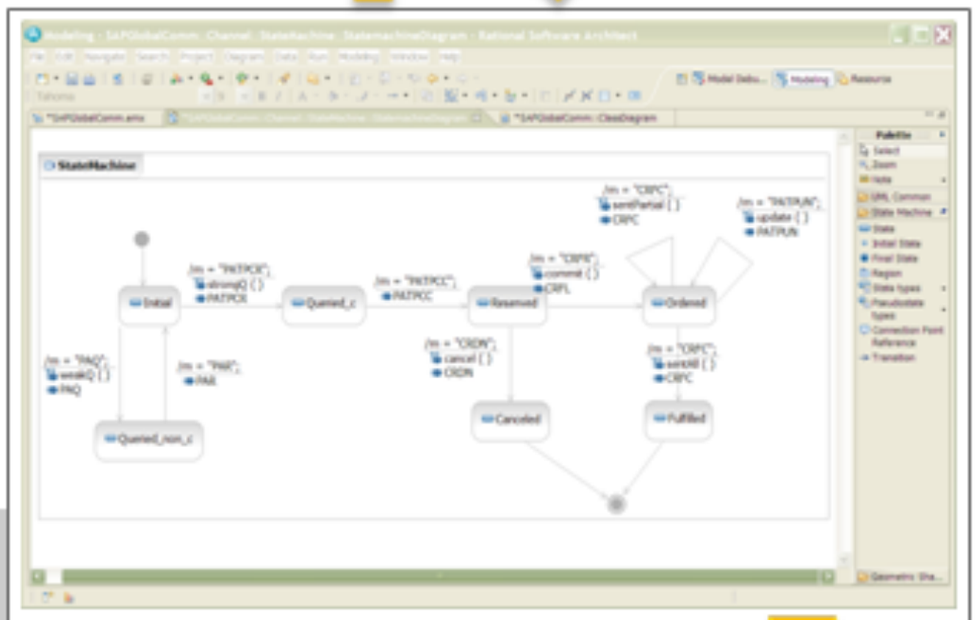


Proces de generare de teste (implementat în proiectul european MODELPLEX)



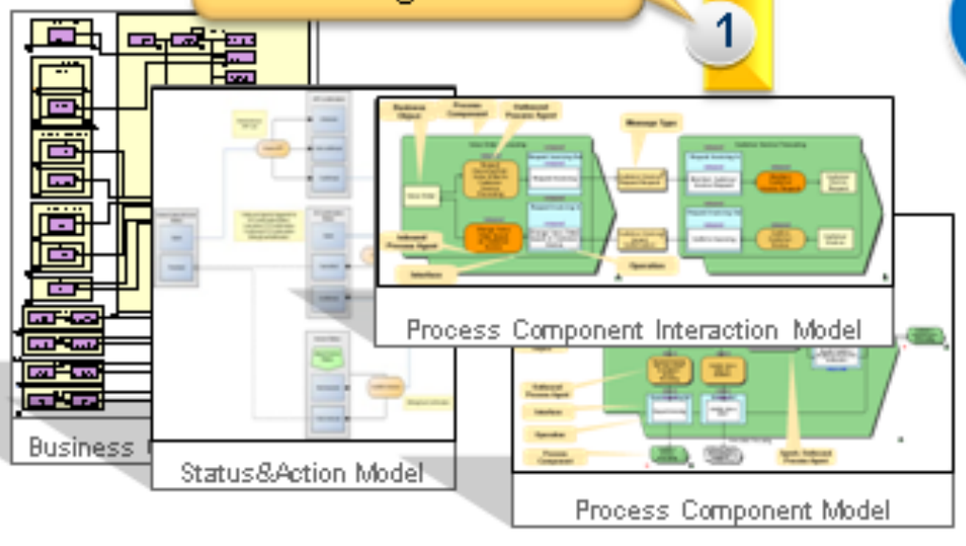
2 Model the behavior (MCM) and add test constraints

3 Transform MCM to UML

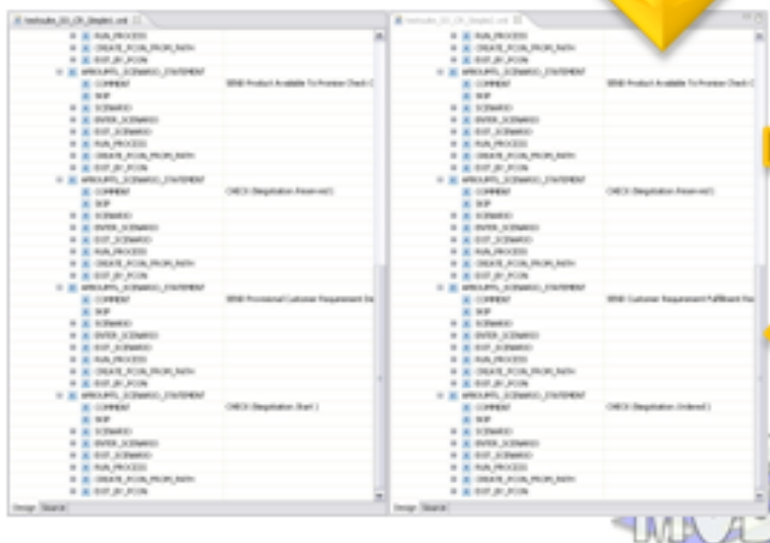


4 Debug the UML model

1 Import structural existing models

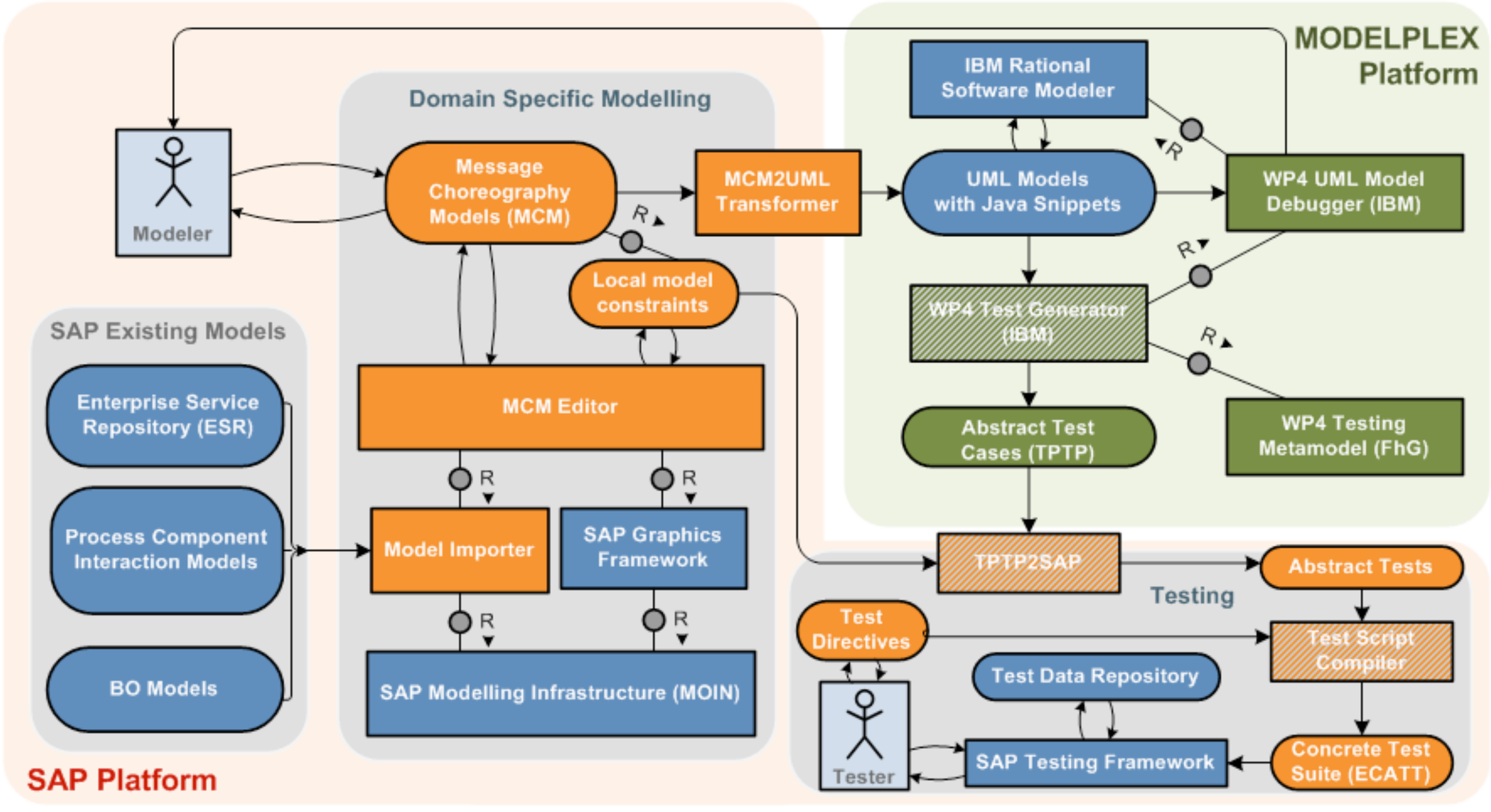


5 Generate test cases



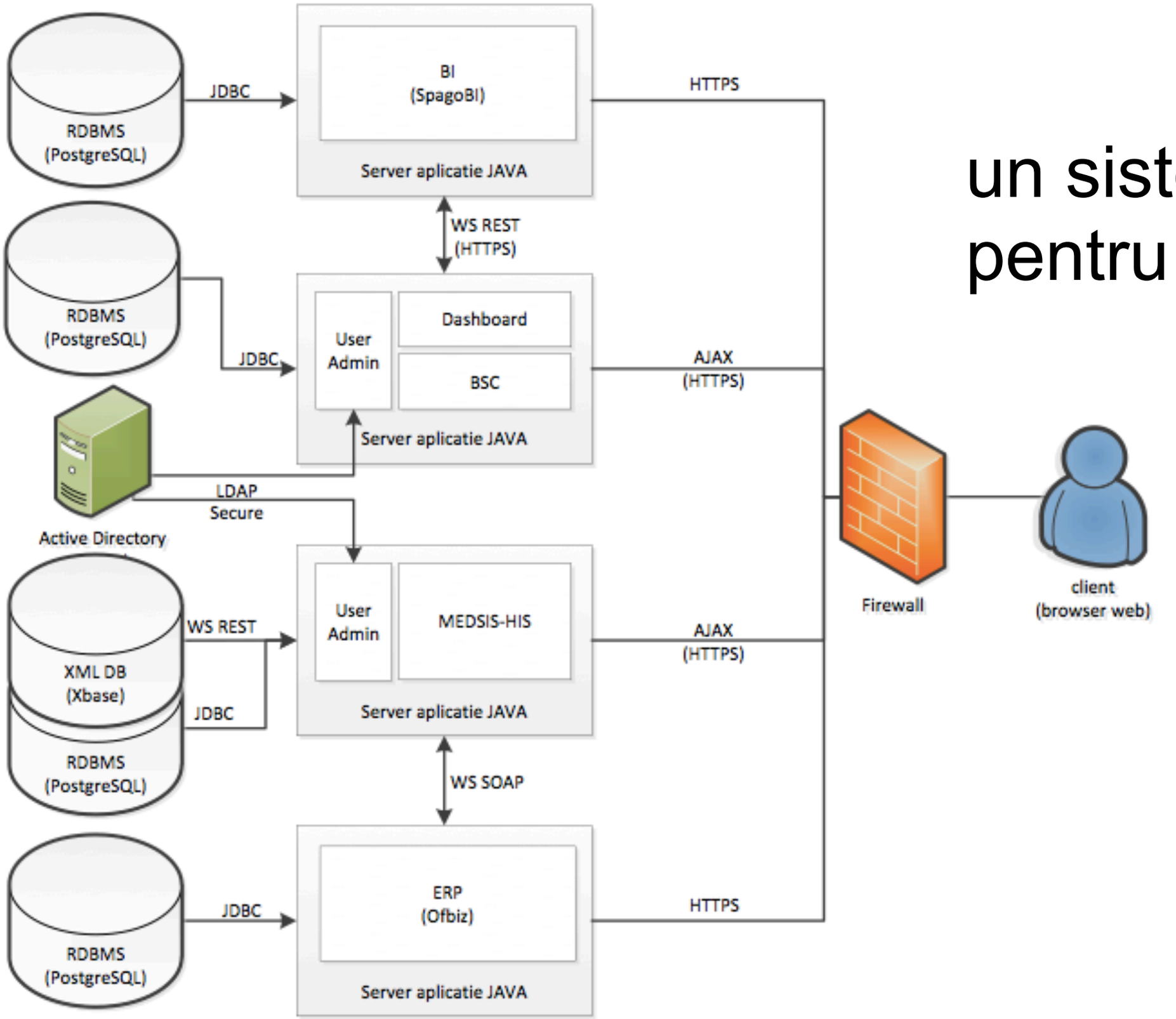
6 Generate test scripts and execute them

Arhitectura implementării anterioare



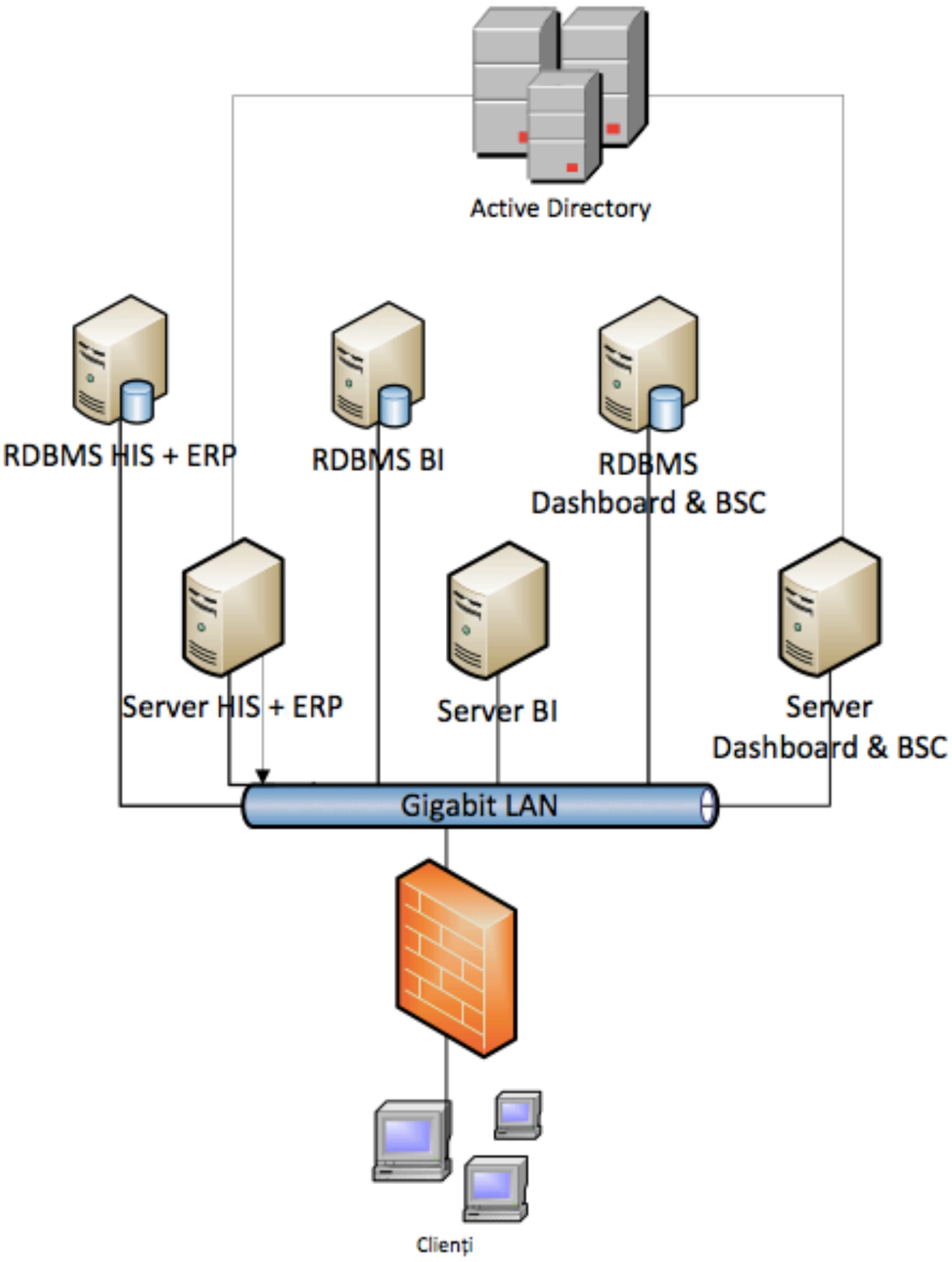
Legend: Already existing · Developed by SAP in MODELPLEX WP1 · Developed by WP4 in MODELPLEX · Work in progress

Exemplul 2 - din domeniul medical



un sistem IT
pentru spitale

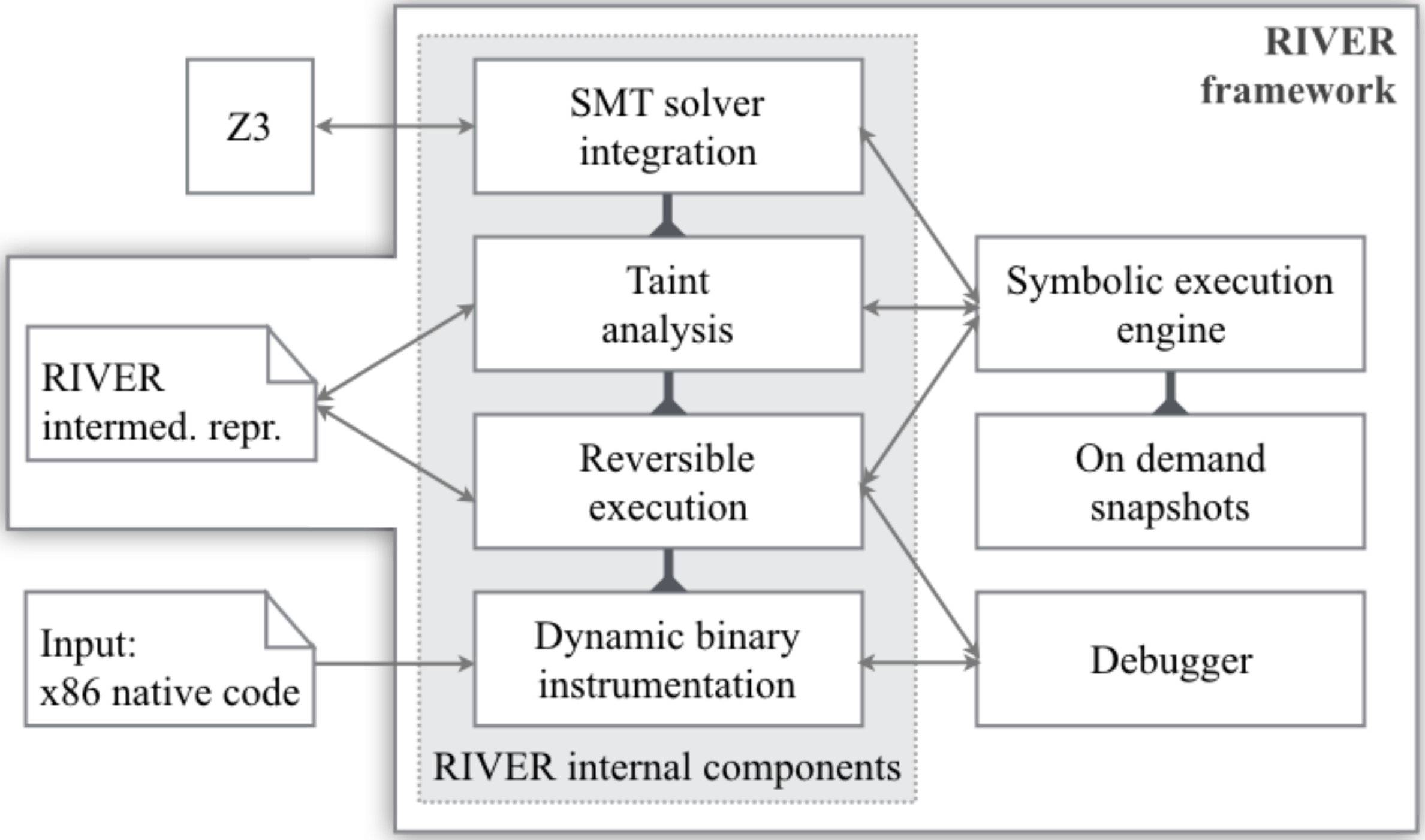
Exemplul 2 - din domeniul medical



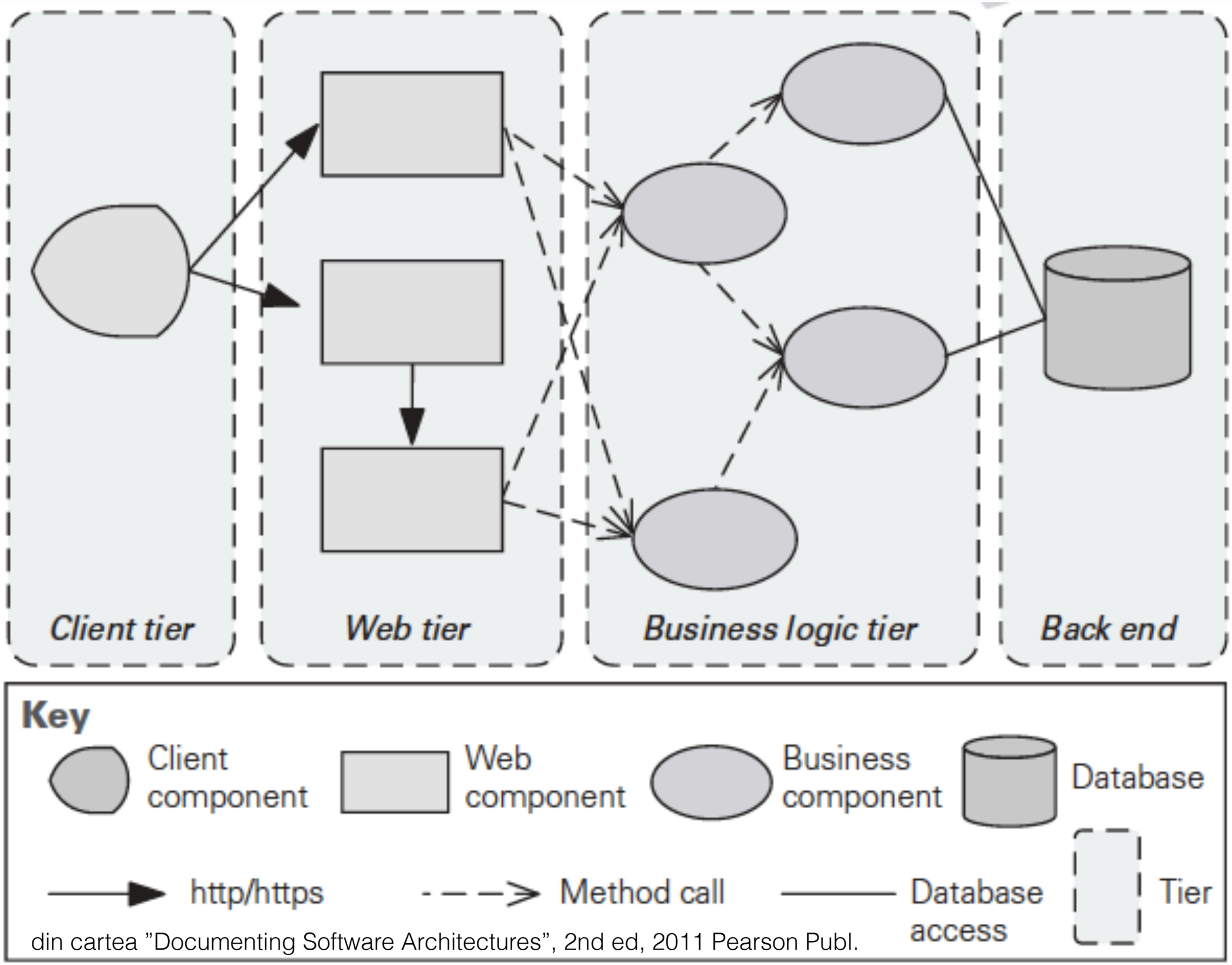
arhitectura hardware

Exemplul 3 - analiza de executabile

arhitectura unui sistem de analiză dinamică pentru fișiere x86
(dintr-un proiect de cercetare în colaborare Bitdefender - UniBuc)

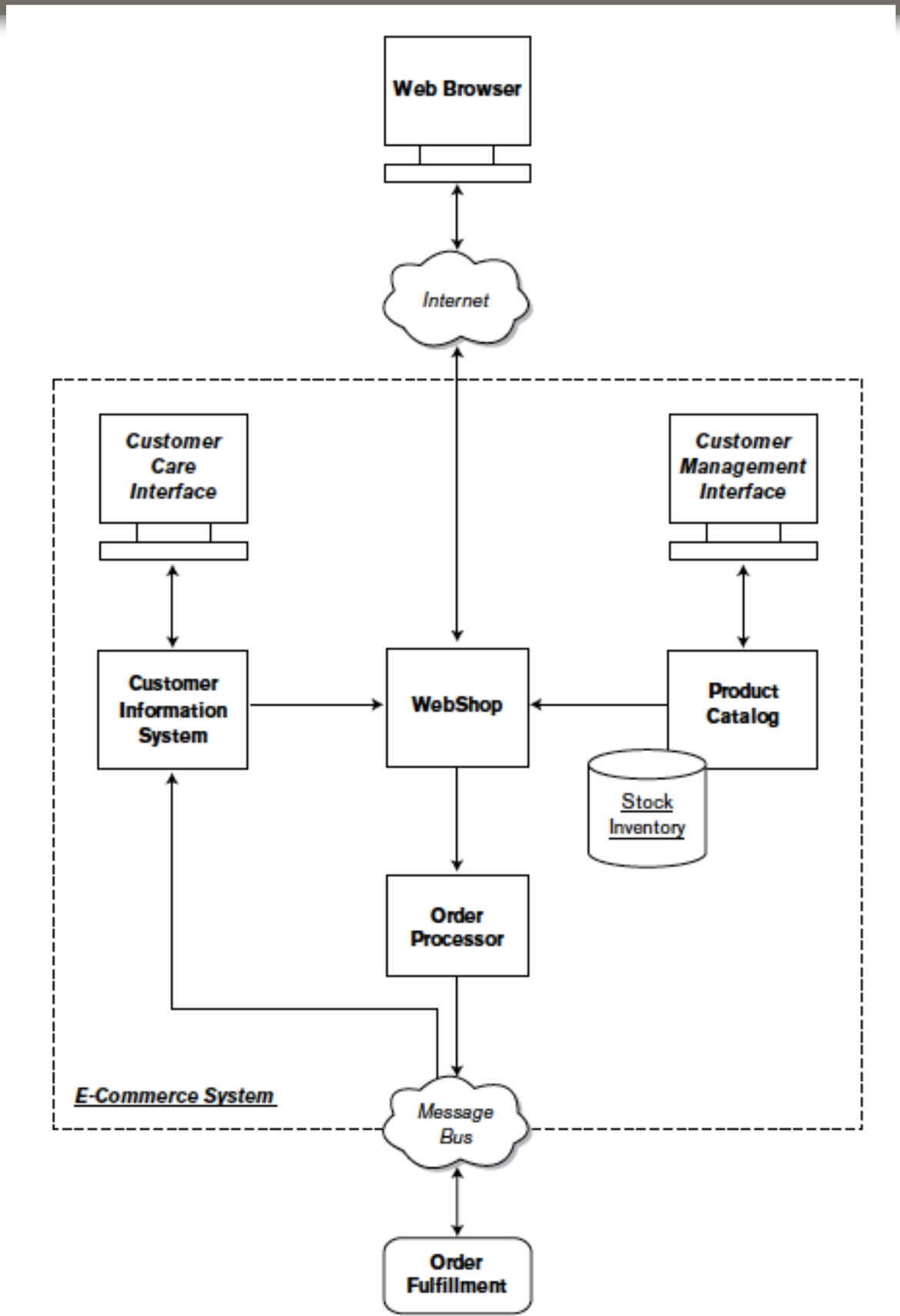


Exemplul 4 - șablon pt. o aplicație web



din cartea ”Documenting Software Architectures”, 2nd ed, 2011 Pearson Publ.

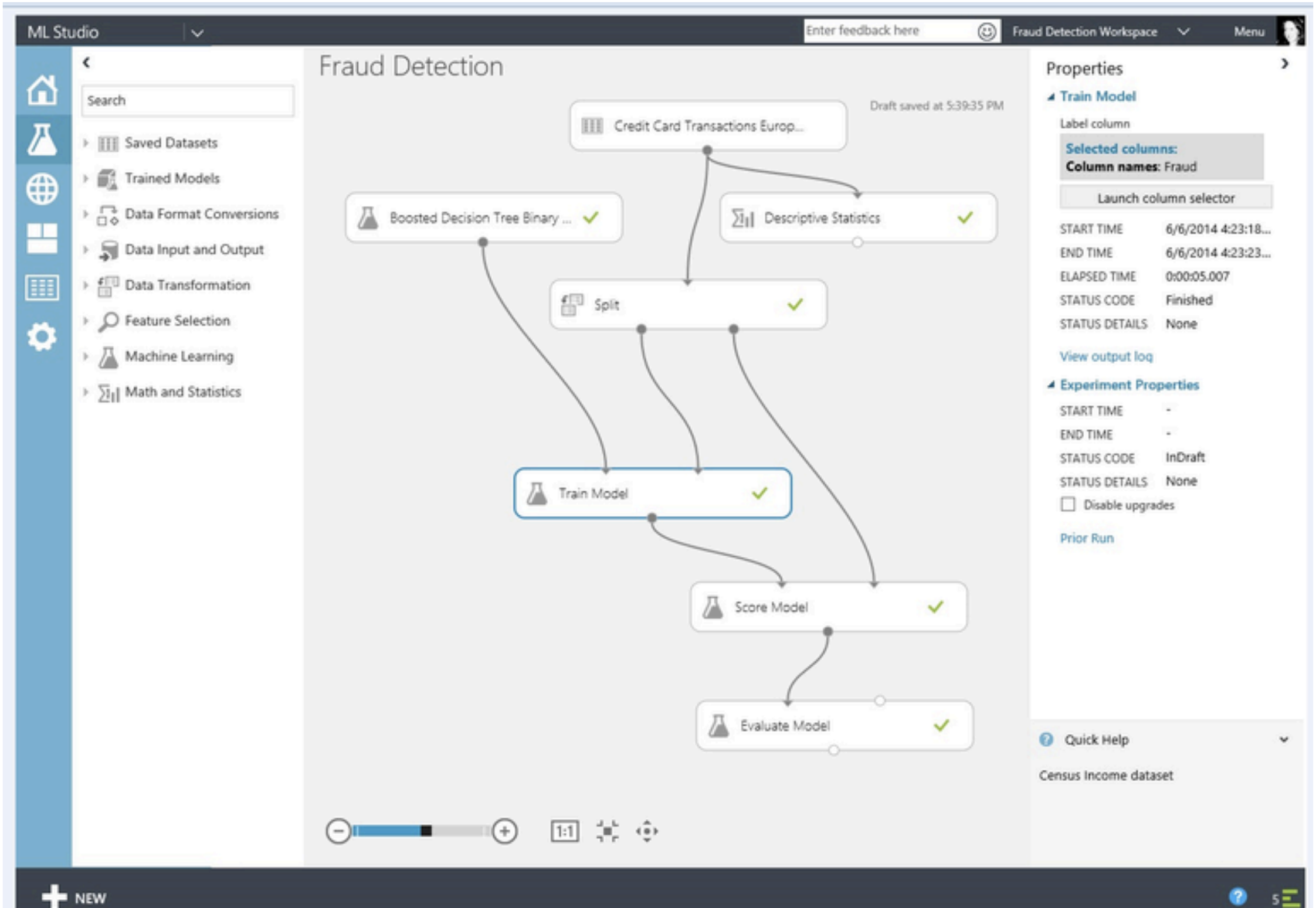
Exemplul 5 - șablon pt. o aplicație web



din cartea ”Software System Architecture”, 2nd ed, 2008 Pearson Publ.

Exemplul 6 - machine learning

Azure ML tool în care se poate face direct arhitectura ”executabilă”



Exemplu 7 - modelare UML a unui joc

`http://rtb-team.sourceforge.net/rtb-team_analysis.htm`

- La linkul de mai sus este un exemplu de proiect software care este documentat prin diverse tipuri de diagrame UML