

# Patterns and Processes for Increasing the Business Reactivity with MDA

**Birol Berkem**

**GOObiz - Goal Oriented Business**

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# Business Reactivity with MDA

**Business Reactivity** : Response time necessary to a business system for implementing requested changes as a reaction to a new requirement, in its controlled process of adaptation to its environment

**Birol Berkem**

**How MDA can help us to increase the business reactivity ?** (to reduce the response time to react to changes )



# Review of MDA Principles for Increasing the « Business Reactivity »

- **Portability** : Platform Independency for Specifications. To do this : Specifications need to be rendered **Identifiable, Evolutive and Executable**
- **Interoperability** : Business components need to communicate for realizing **coherent behaviors** according to **high-level business strategies**
- **Reusability** : Ability for applications to **use changing business behaviors** with a total transparency when changes happen !
- Primary goals of MDA : Text for an MDA Guide : ormsc/02-08-01- J.Miller

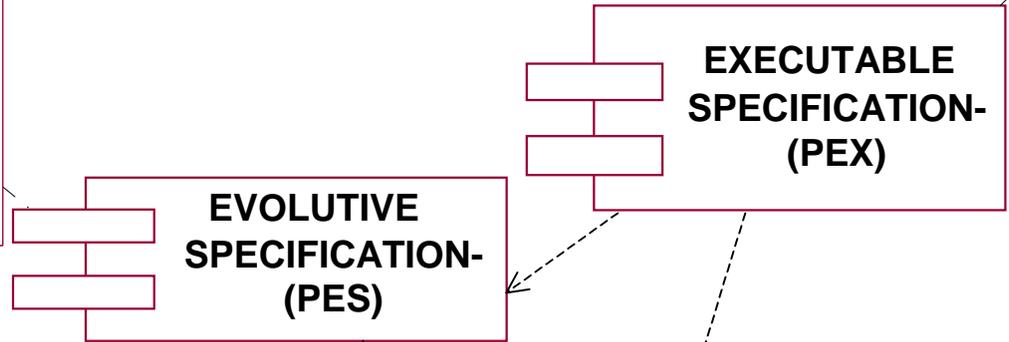


# Portability (Platform Independency for Specifications)

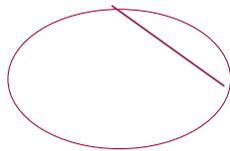
Specifications need to be **Identifiable**, **Evolutive** and **Executable**

Guarantees platform independency of specifications at a given **abstraction level** by rendering them **executable** without using particularities of the immediate lower-level

Assures easy **evolutions** to system behaviors by allowing **traceability** of specifications of a given *refinement level* toward lower-level specifications using goal-oriented refinement techniques



*A Goal-Case contains a set of responsibilities that belong to the same unit of intention*



<< Goal Case >>



Makes identifiable specifications using Goals (Classes) and Aptitudes (Operations)



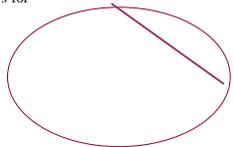
# PIS - Pattern for Identifiable Specifications

## Process of Development for "Increasing Market Parts -V1" List of High-Level Strategic Goals

- G1 : Enhance Production Process
  - G1.1 : Efficient Production
  - G1.3 : Efficient Purchase
- G2 : Motivate staff (means :..)
  - G2.0 : Develop a program for staff motivation
  - G2.1 : Communicate program
  - G2.2 : Accompany program
- G6 : Increase profits for Sales
- G5 : Increase profit of the Internet Site
- G4 : Enhance productivity of the Production and Delivery Chains
  - G4.2 : Enhance efficiency of the Production
  - G4.2.1 : Products conform to Mktg Specs
  - G4.2.2 : Respect delays for production
- G3 : Increase volume of transactions (500 Transactions a day)
  - G3.1 : Increase rate of visits
    - G3.1.1 : Links from other sites
    - G3.1.2 : Site reviewed in medias
    - G3.1.3 : Visible in search engines
  - G3.2 : Motivate visitors to register via a bonus system
    - Make registration beneficial via a bonus system (Goal-Value = 100 registrants a week )
    - ...
    - Invent a bonus system
    - Attractive pricing
  - G3.4 : Increase visitor reliability

*A Goal-Case is created in the system when a complex requirement is received by the system*

*It contains a set of responsibilities that belong to the same unit of intention*

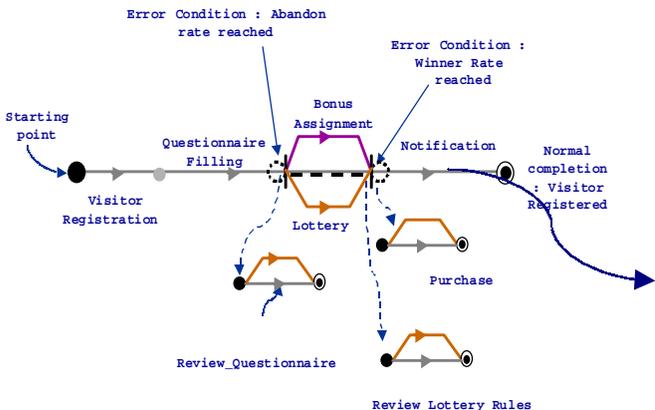


**<< Goal Case >>**

Activities of a Goal-Case may be identified via an Activity Diagram,..

Description for the Goal-Case

Register Visitor -V1  
(Goal-value = 100 registrants / week, duration = 'till new order', Means = Lottery and Bonus )



**Visitor [Registration]**  
(Goal-value = 100 registrants a week ,..)

---

entered\_ok : boolean  
bonus\_affected : boolean  
lottery\_realized :boolean  
visitor\_notified : boolean

---

+register\_visitor()  
+cancel\_register()  
+modify\_register()  
-enter\_visitor()  
-fill\_questionnaire()  
-notify\_visitor()  
-notify\_rate\_of\_registrant()  
-abort\_transaction()...

**Goal-Oriented Object (GOO) : A Platform Independent Structure**

*A Complex Responsibility may also require to be identified as a separate GOO;*

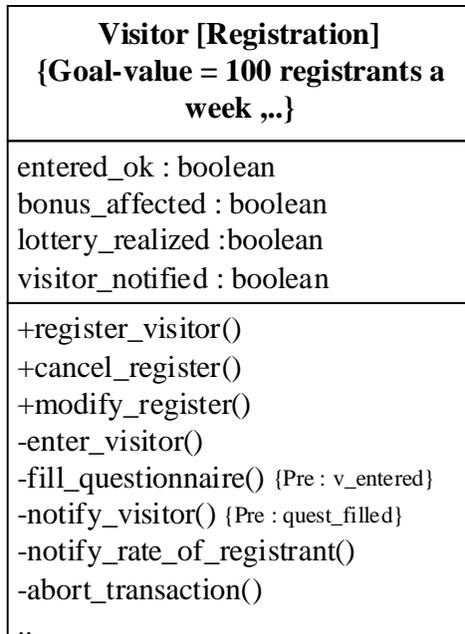


# PES - Pattern for Evolvable and Traceable Specifications

• Guarantees evolutivity of specifications by providing explicit description of complex behaviors at each refinement level and by assuring traceability toward lower levels

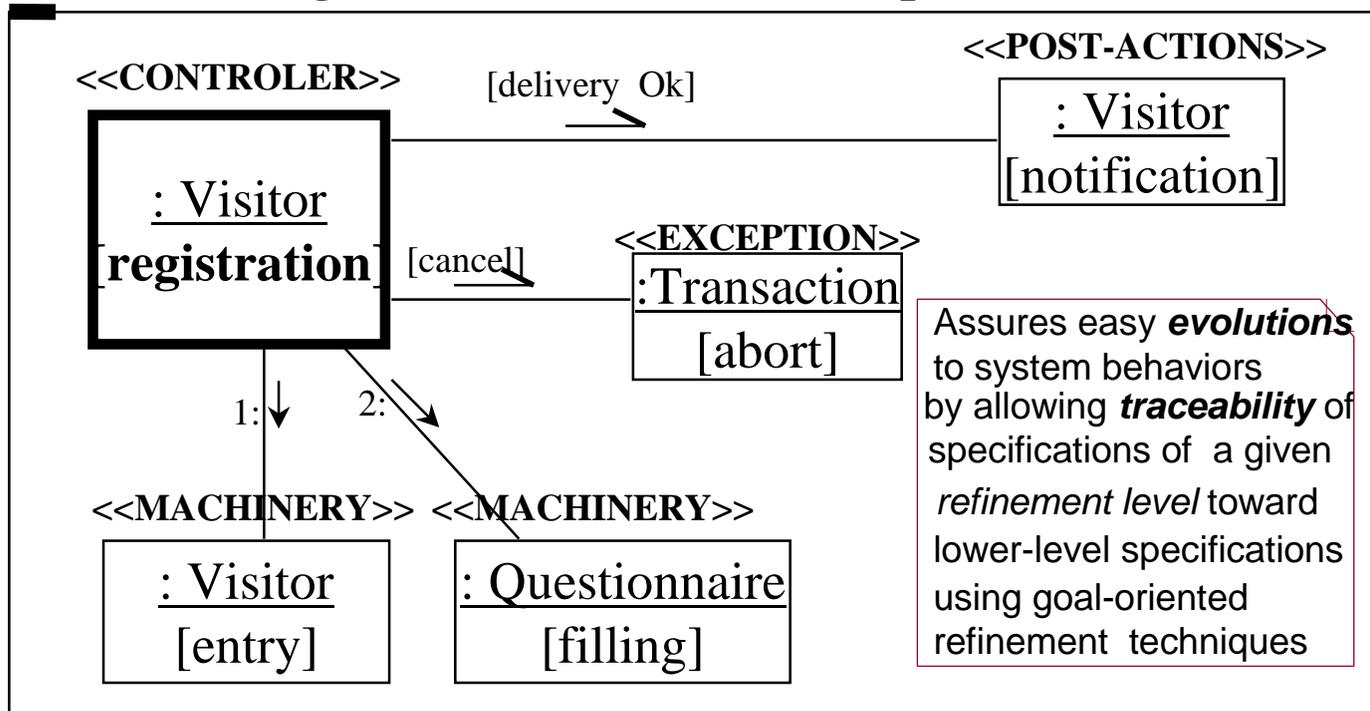
• Each complex operation in a GOO may be identified as a separate GOO within a

## Component of Goal-Oriented Objects (GOO\_Comp)



↳ << refined by >>

### Visitor [Registration] : A GOO\_Comp



A GOO\_Comp regroups behaviors that act as Controller, Machinery, Exception or Post-Actions in the achievement of operations of their controller.



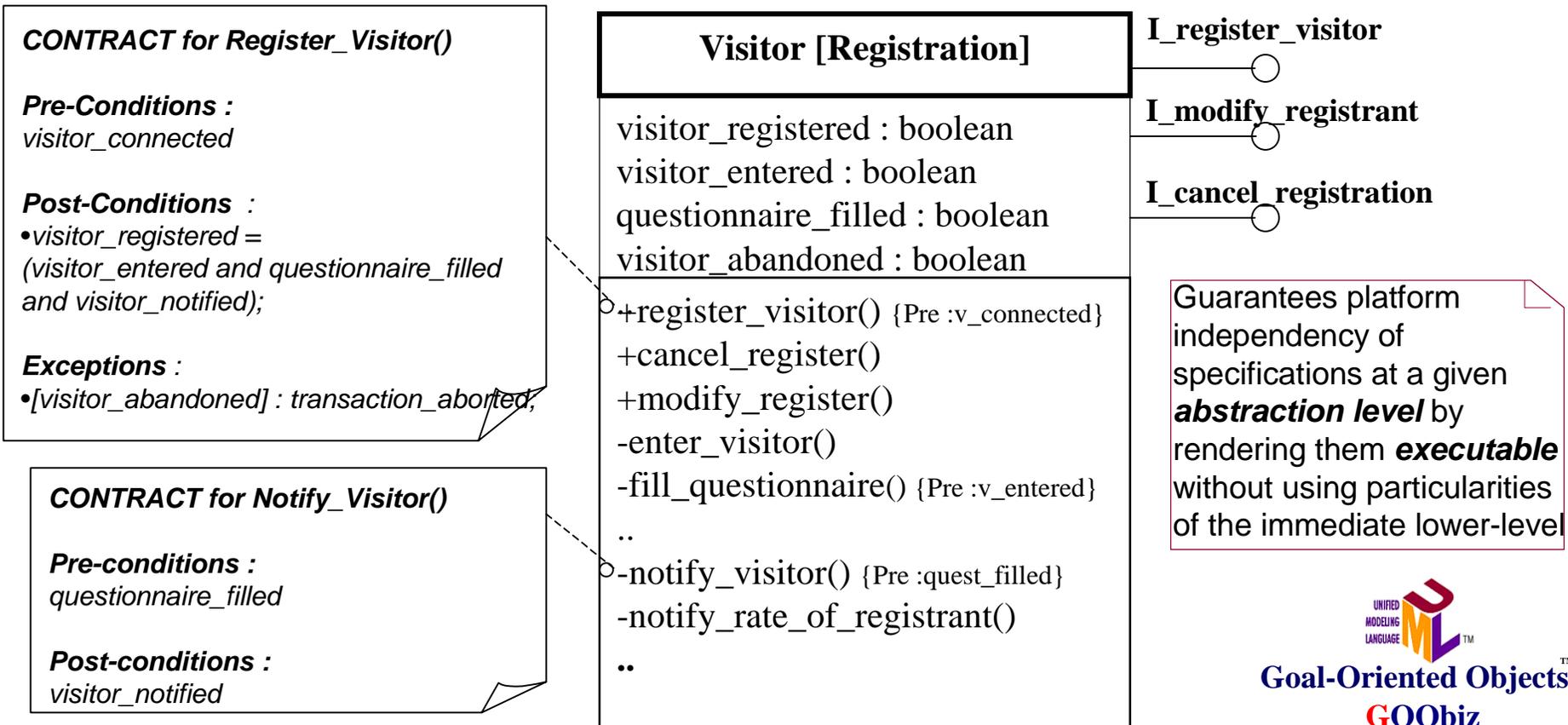
# PEX - Pattern of Executable Specifications

- **Guarantees independency of specifications from elements of lower abstraction levels by rendering them *executable* at each level**

- **Requirement Analysis focus on elements of the : ‘*Functional What*’**

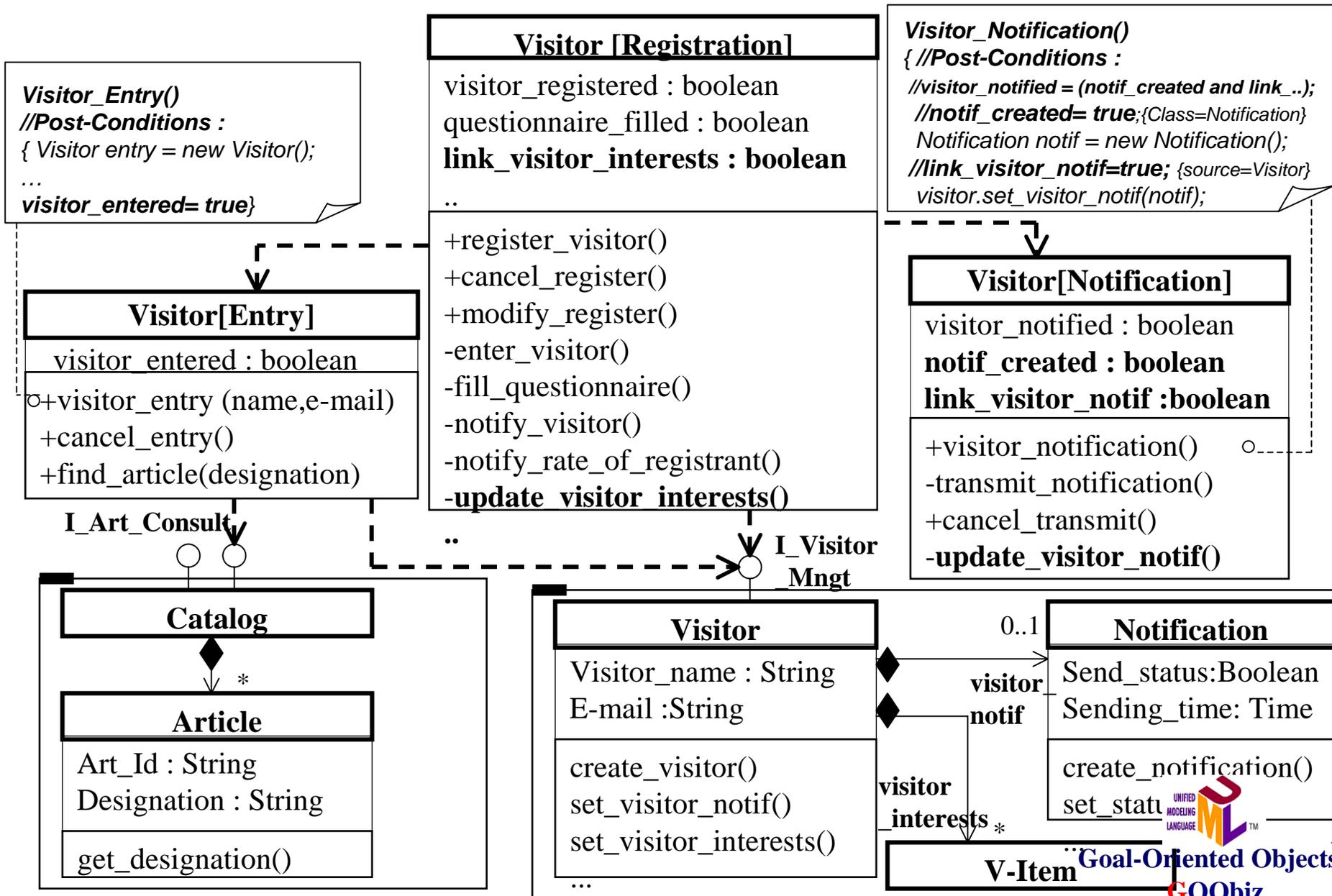
- **System Analysis focus on the ‘*Functional How*’**

- **Design focus on elements of the ‘*Technical What and How*’**



# PEX - Pattern of Executable Specifications

## From Contract to the Execution



# Interoperability requires communication between components to realize coherent behaviors according to business strategies - It necessitates :

- (a) respect to high-level business goals and constraints in face of changes
- (b) communication of required behaviors to actors of the application layer

Assures coherent evolution to the system by allowing its components integrate :

- Respect to high-level business goals
- Controls to assure feed-backs in order to bring corrections to the running system

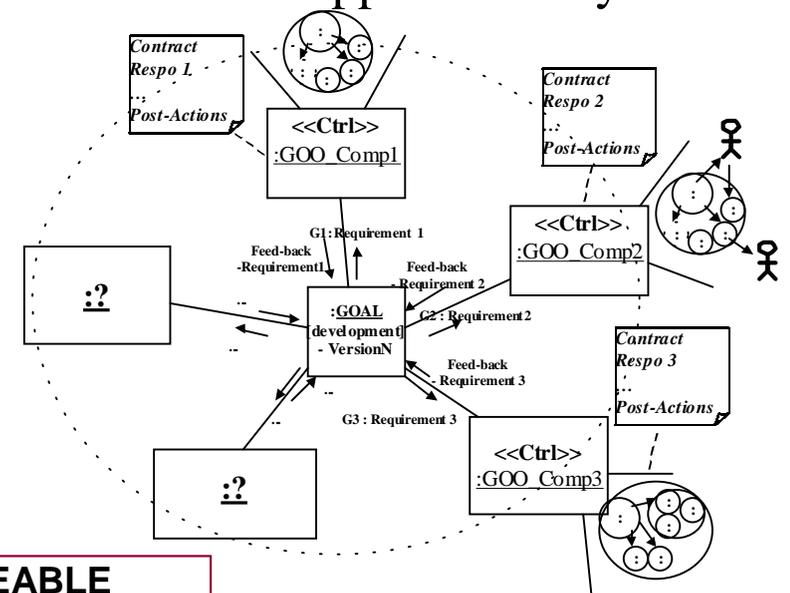
**(a)** COHERENT EVOLUTION-(PCE)

**(b)** TRACEABLE ABSTRACTION LAYERS-(PTAL)

EVOLUTIVE SPECIFICATION-(PES)

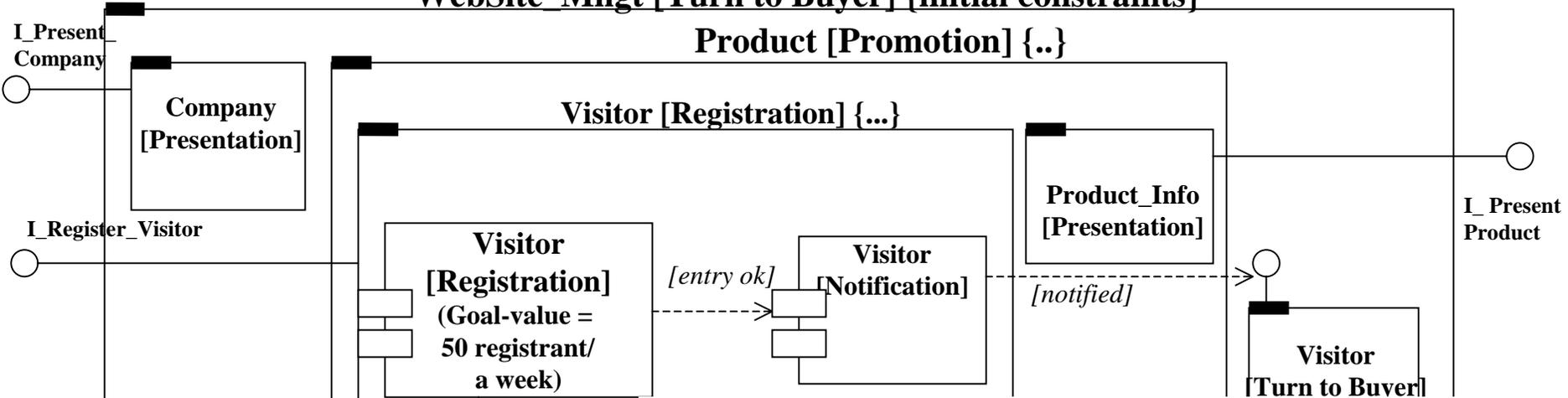
EXECUTABLE SPECIFICATION-(PEX)

Affects relevant responsibilities to the actors of the application system layer



# (a) PCE - Pattern for Coherent Evolution- Mapping Changes

WebSite\_Mngt [Turn to Buyer] {initial constraints}



**Existing Business Architecture**

**Process of Development for "Increasing Market Parts -V1"**  
List of High-Level Strategic Goals

- G1 : Enhance Production Process
  - G1.1: Efficient Production
  - G1.3 : Efficient Purchase
- G2 : Motivate staff (means ..)
  - G2.0 : Develop a program for staff motivation
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      - Attractive pricing
  - G3.4 : Increase visitor reliability

**G 3.2 - Motivate Visitors to Register via a bonus system**  
(Goal-value = 100 registrants a week)  
**G3.2.1: Register Visitor()**

**G3.2.2 : Fill Questionnaire**

- **G3.2.2.1** If the abandon rate reaches x % , trigger the process of Review of the Questionnaire

**G3.2.3 : Once visitor is registered, compute bonus and launch lottery system**

- **G3.2.3.1** If winner rate is reached, start the process of Review\_Lottery Rules

- **G3.2.3.2** If stock\_alert, process Material Purchase

• **G3.2.4 : Notify results to visitor by e-mail, once lottery and bonus calculation are completed**

**New Requirements to Map**

To assure coherent evolution to the system

Questions are :

- What are top level components that might.. be concerned by the changes ?
- Which controls become necessary in order to bring corrections to the running system ?

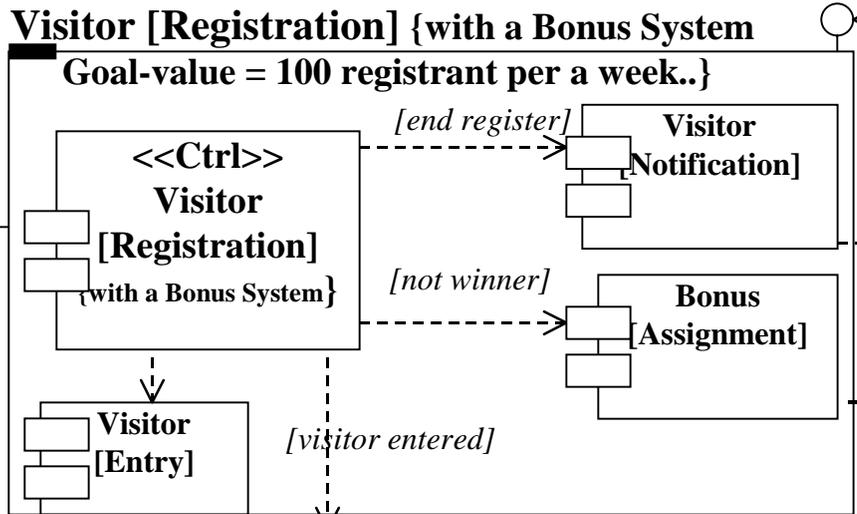
# (a) - Pattern for Coherent Evolution- Mapped Changes ...

WebSite\_Mngt [Turn to Buyer] {Motivate Visitors to Register with a Bonus System}

Product [Promotion] {Motivate Visitors to Register with a Bonus System..}

Company [Presentation] {Promote Registration with a Bonus System..}

I\_Register\_Visitor



Product\_Info [Presentation]

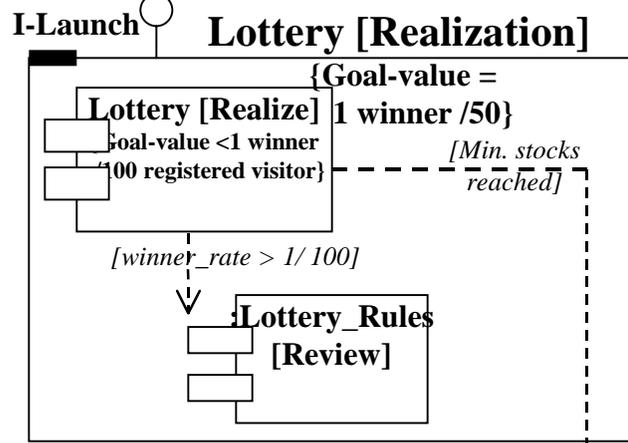
I\_Present Product

I\_Make\_Buyer

Visitor [Turn to Buyer]

[bonus critical rate]

I\_Bonus\_Review  
 Bonus\_Rules [Review]



I-Purchase

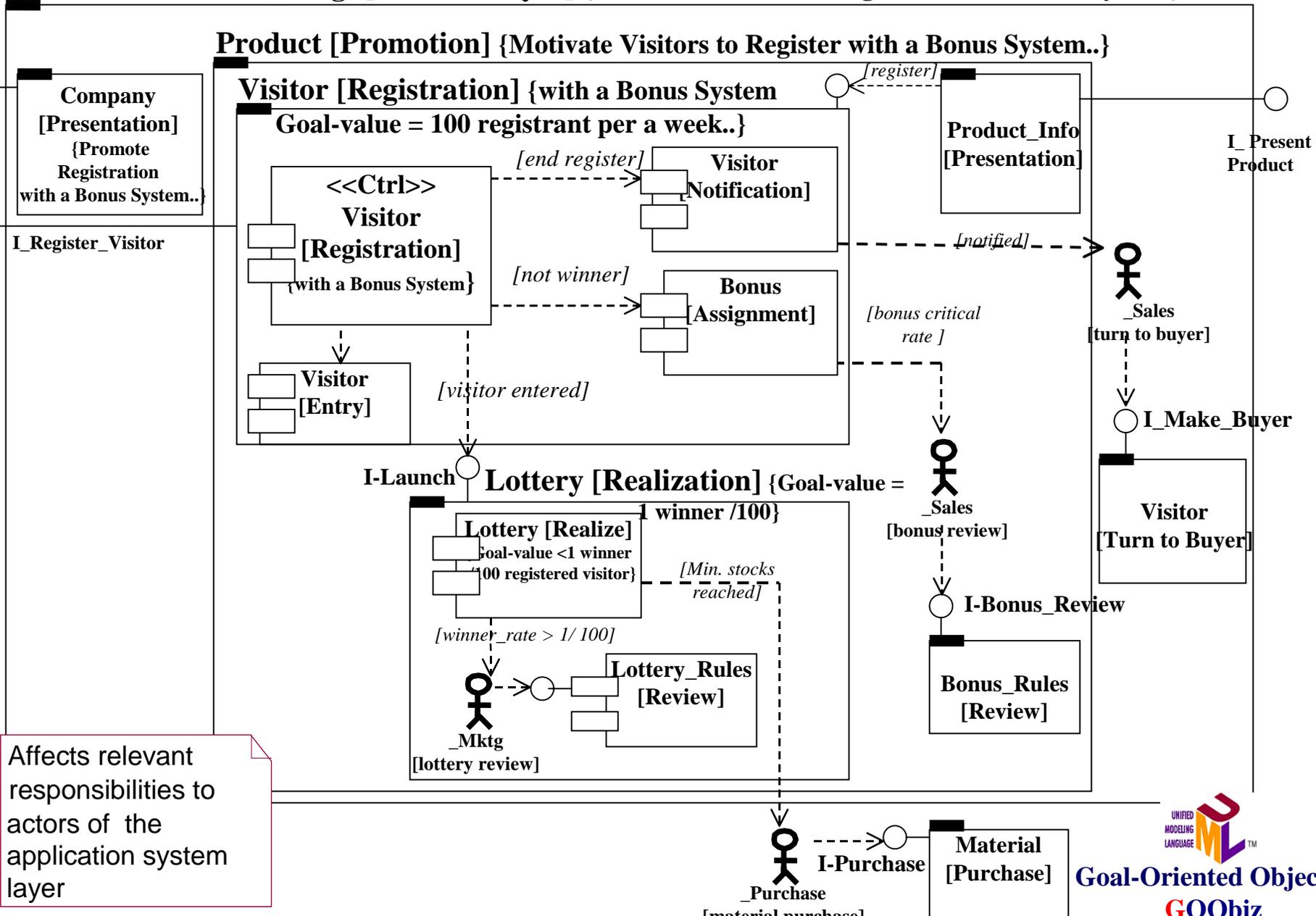
Material [Purchase]

Assures coherent evolution to the system by allowing its components integrate :

- Respect to High-level business goals
- Controls for ensuring feed-backs in order to bring corrections to the running system

# (b) PTAL - Pattern for Traceable Abstraction Layers...

WebSite\_Mngt [Turn to Buyer] {Motivate Visitors to Register with a Bonus System}



# Reusability : Ability to use changing business behaviors within applications with a total transparency from changes

**USE BUSINESS BEHAVIORS- (PUB-BAL)**

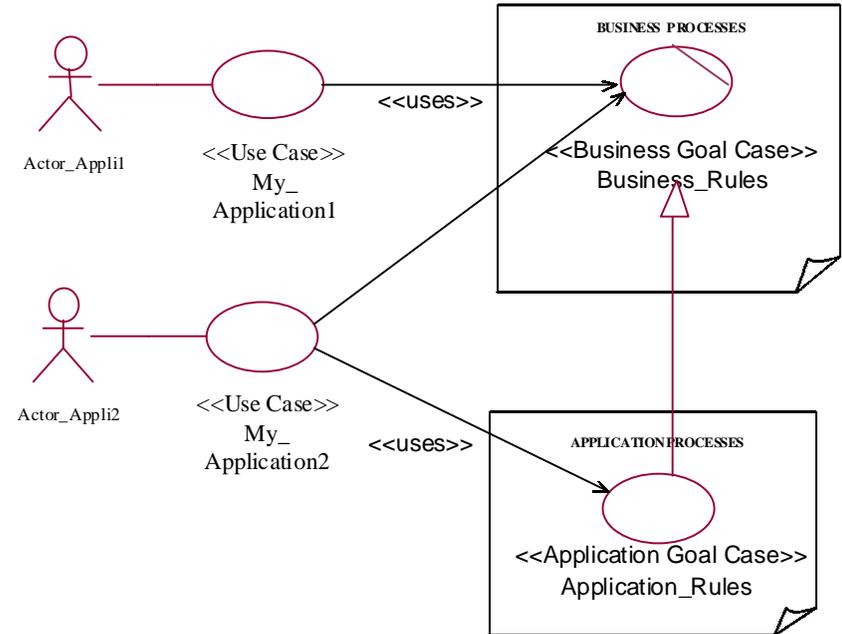
Allows actors of the application system layer, to use behaviors defined in the business layer with their application constraints

**TRACEABLE ABSTRACTION LAYERS-(PTAL)**

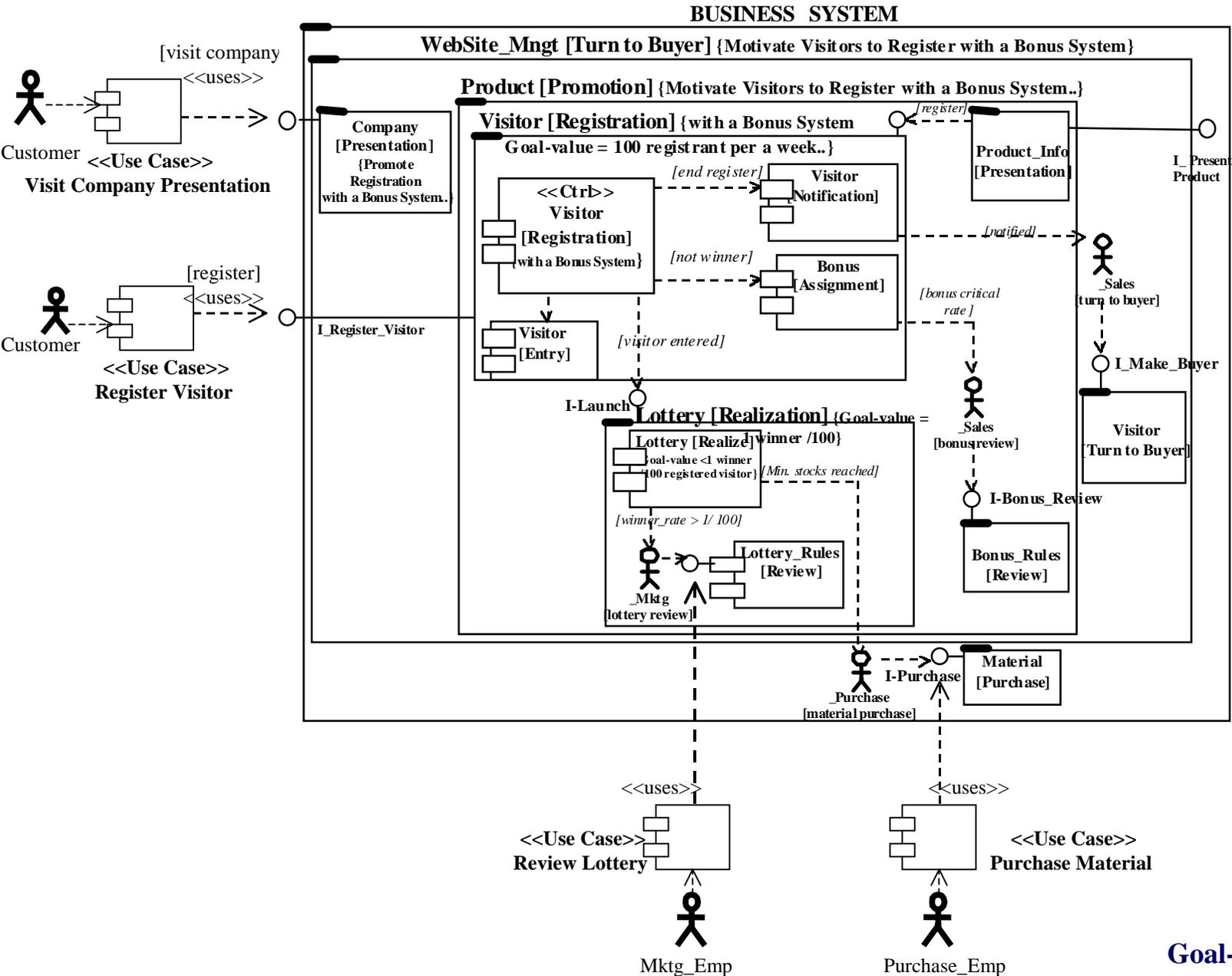
**EXECUTABLE SPECIFICATION- (PEX)**

**EVOLUTIVE SPECIFICATION- (PES)**

## PUB-BAL - Pattern for Using Business Behaviors



# PUB-BAL - Pattern for Using Business Behaviors



# Summary of Patterns for Business Reactivity with MDA

Assures coherent evolution to the system by allowing its components integrate

- High-level business goals
- Controls to assure feed-backs in order to bring corrections to the running system

**COHERENT EVOLUTION-(PCE)**

**USE BUSINESS BEHAVIORS-(PUB-BAL)**

Allows actors of the application system layer, to use behaviors defined in the business layer with their application constraints

**TRACEABLE ABSTRACTION LAYERS-(PTAL)**

Affects relevant responsibilities to actors of the application system layer

**EXECUTABLE SPECIFICATION-(PEX)**

Guarantees platform independency of specifications at a given **abstraction** level by rendering them **executable** without using particularities of the immediate lower-level

**EVOLUTIVE SPECIFICATION-(PES)**

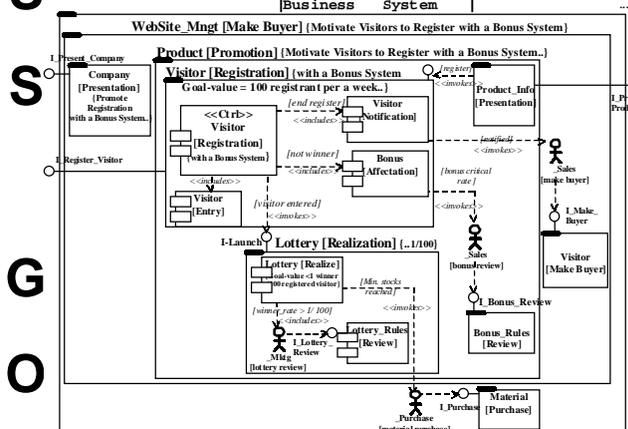
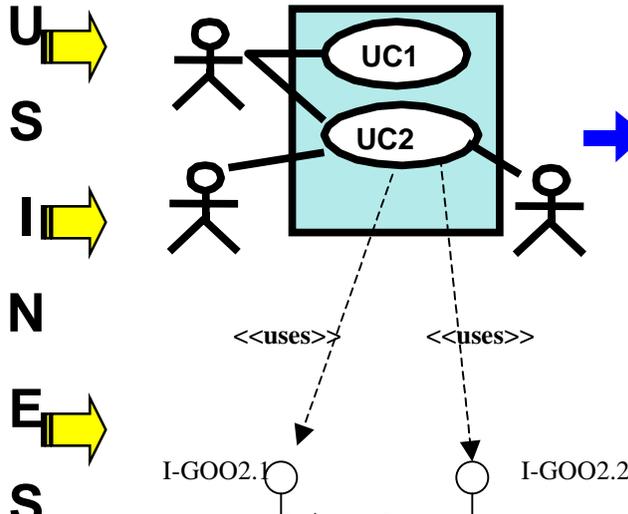
Assures easy **evolutions** to system behaviors by allowing **traceability** of specifications of a given **refinement** level toward lower-level specifications using goal-oriented refinement techniques

**IDENTIFIABLE SPECIFICATION-(PIS)**

Makes identifiable specifications using Goals and Aptitudes

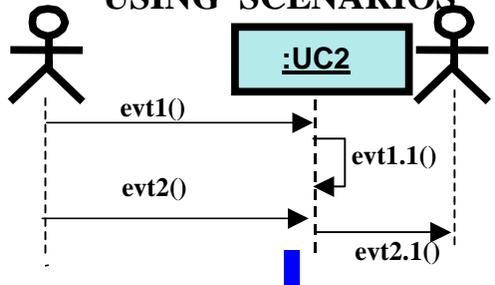


**DESIGN USE CASES, BASED ON RESPONSIBILITIES IDENTIFIED IN THE SYSTEM ARCHITECTURE**

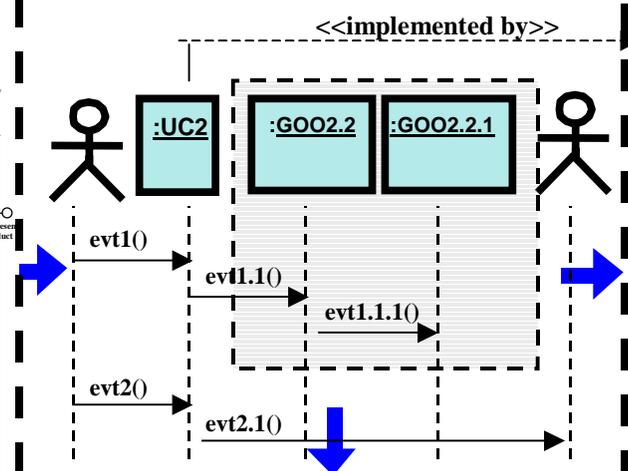


**USE COMPONENTS OF THE BUSINESS ARCHITECTURE (TRANSFORMED FROM AN UNDERSTANDABLE LANGUAGE AFTER VALIDATION BY NON-TECHNICAL PEOPLE)**

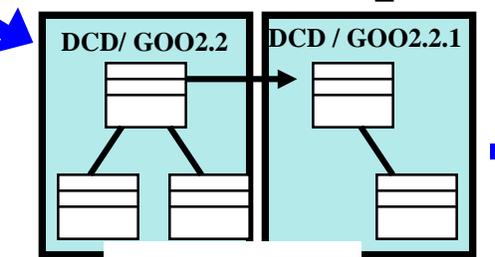
**GATHER APPLICATION REQUIREMENTS USING SCENARIOS**



**DETAIL APPLICATION REQUIREMENTS THAT USE BUSINESS COMPONENTS**



**Specify Constraints Upon Domain Classes / GOO\_COMP**

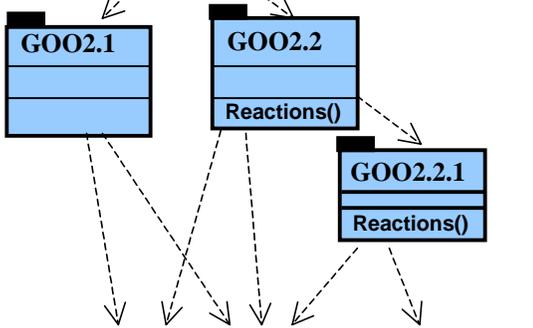


**P I M**

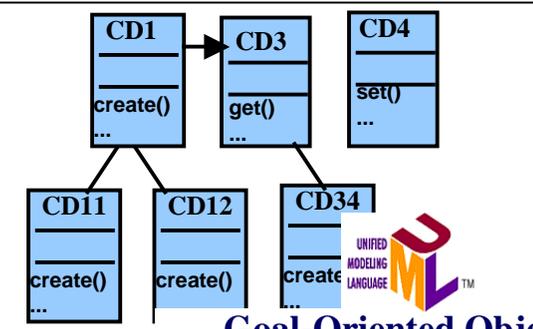
**IMPLEMENT COMPONENTS in the TECHNICAL ARCHITECTURE**



**APPLICATION - CTRL**



**ENTITIES- CTRL-ACCESS**



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