

Especificando Variações em Requisitos

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Motivação

Antes de começarmos:

Por que representar variações nos requisitos?

Motivação

Antes de começarmos:

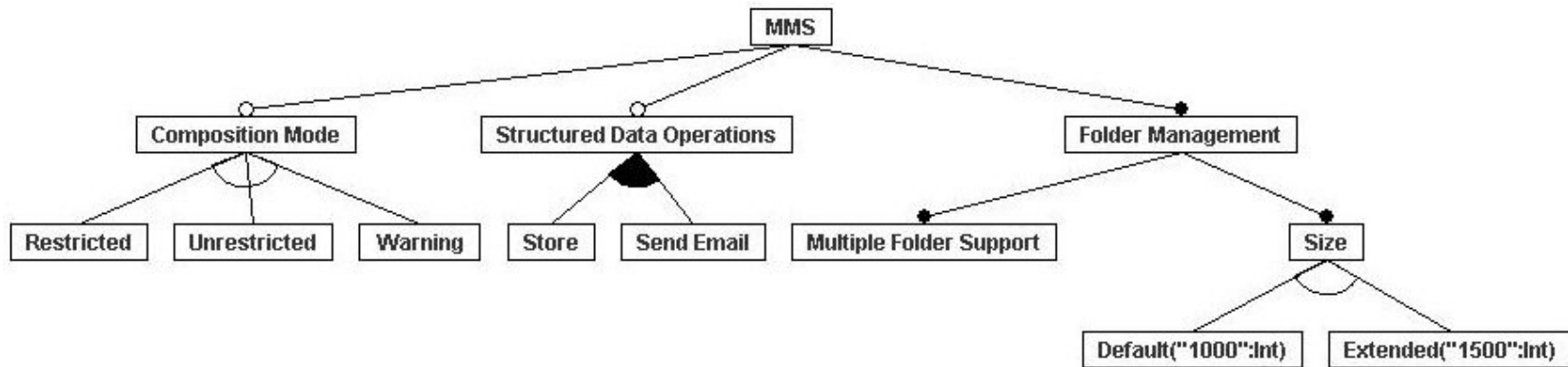
Por que representar variações nos requisitos?

- Guiar as atividades de design, codificação e testes (que podem incluir pontos de variação)
- Identificar variações não percebidas na análise de domínio
- Auxiliar na seleção dos mecanismos de variação em código fonte, por exemplo

Terminologia

- Requisitos funcionais x Não funcionais (NFR)
- Diferentes níveis de abstração
 - ✓ Necessidades dos usuários e interessados
 - ✓ Recursos oferecidos pelos produtos (histórias do XP)
 - ✓ Características do produto
 - ✓ Casos de uso e cenários
- Diferentes formas de representar os requisitos
 - ✓ especificação textual x especificação visual

MMS Product Line



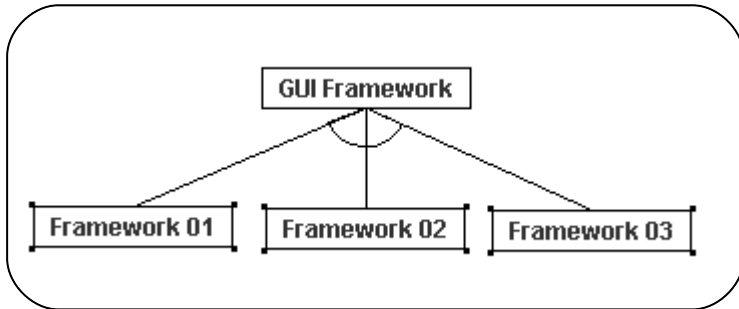
- SPL usada em estudos de caso do grupo SPG
- Exemplos da aula extraídos dessa linha
- Características:
 - Número reduzido de features e cenários
 - Representativa quanto às variações

Variações em NFR

- Mecanismos aplicados:
 - ✓ Seleção de requisitos opcionais
 - ✓ Parametrização dos requisitos

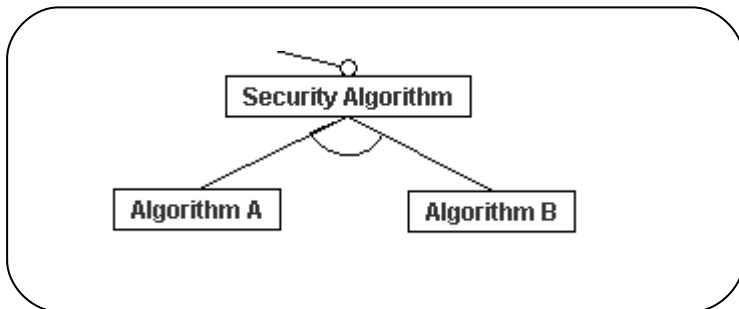
Variações em NFR

Exemplos



Req 73

The message application shall be developed using the <GUI_FRAMEWORK> framework as base platform UI.



Req 123

The message content shall be encrypted using the <SEC_ALG> algorithm, when the user selects the send message in security mode option.

Variações em Cenários

- **Scenario:** Concrete description of system usage which provides a clear benefit for the actor of the system. (Klaus Pohl)
- Abordagens para representar variações em cenários:
 - ✓ PLUC
 - ✓ PLUSS
 - ✓ Variability Management (VM) as Crosscutting
 - ✓ AMPLE

PLUC

- Novas tags para representar variações nas especificações de cenários
 - Tag alternativa
 - Tag opcional
 - Tag parametrizada
- Forte acoplamento entre o espaço de variações e as especificações de cenários
 - Difícil de evoluir a linha de produtos!

PLUC

PL Use Case: Create and Send a Message.

Goal: Create and send a multimedia message

Primary actor: Subscriber

Main success scenario - The message box has not reached [VP2] messages. (FM)

1. The subscriber starts the message center application
2. The message center application is started
3. The subscriber selects Create New MMS option
4. The create a new MMS form is displayed
5. The subscriber fills in the message body
6. The message body is filled in
7. The subscriber selects the send message option
8. The recipient form is displayed
9. The subscriber fills in the recipient field and select the confirm option.
10. The message is sent to the recipient and saved in the sent folder
11. The send message transient is displayed
12. The application returns to message center

Extensions

5 Include a multimedia content

- 5a.1. The subscriber selects the include a [VP3] content option (CT)
- 5a.2. The list of all [VP3] available resources is displayed (CT)
- 5a.3. The subscriber selects one specific resource
- 5a.4. The selected resource is attached to the multimedia message
- 5a.5. The application returns to step 5

5 Include a DRM restricted content in Restricted Mode

- 5a.1. The subscriber selects the include a [VP3] content option (CT)
- 5a.2. The list of all [VP3] available resources is displayed (CT)
- 5a.3. The subscriber selects one DRM restricted resource (CM)
- 5a.4. The system reports the DRM restriction: the subscriber can not attach the resource (CM)
- 5a.5. The application returns to step 5

Variations

VP1: Alternative

- 0 P1
- 1 P2
- 2 P3

VP2: Parametric

Case VP1

- 0: 1000
- 1: 1000
- 2: 1500

VP3: Parametric

Case VP1

- 0: {Image}
- 1: {Image, Audio, Video}
- 2: {Image, Audio, Video}

PLUC

...

- 9 Store embedded phone number **[requires vp3 = true]**
 - 9a.1. The subscriber scrolls to a phone number embedded in the message (SDO)
 - 9a.2. The phone number selected is highlighted (SDO)
 - 9a.3. The subscriber selects the add to a contact option (SDO)
 - 9a.4. The address book application is started to add the selected number to a contact
 - 9a.5. The message application returns to step 9

VP1: Alternative

0 P1

1 P2

2 P3

VP2: Parametric

Case VP1

0: {Image}

1: {Image, Audio, Video}

2: {Image, Audio, Video}

VP3: Parametric

Case VP1

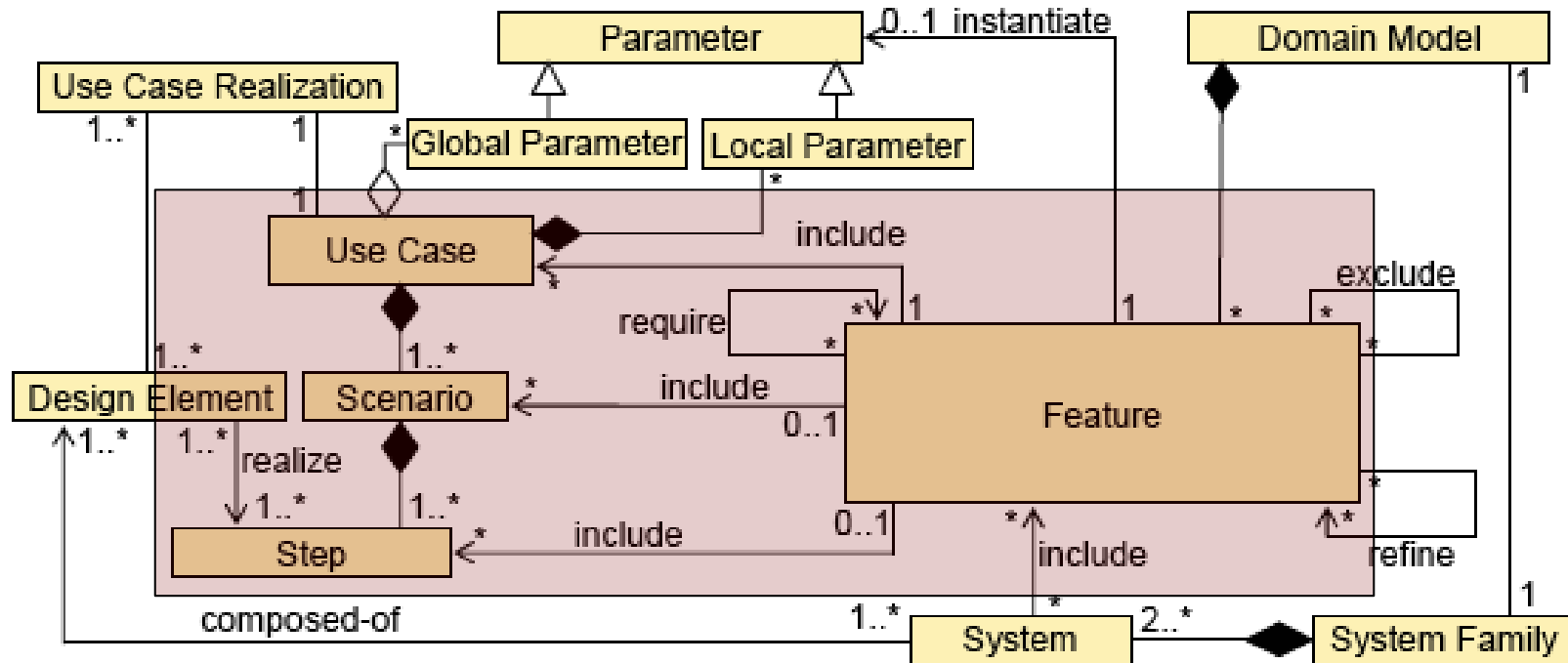
2: TRUE

default: FALSE

PLUSS

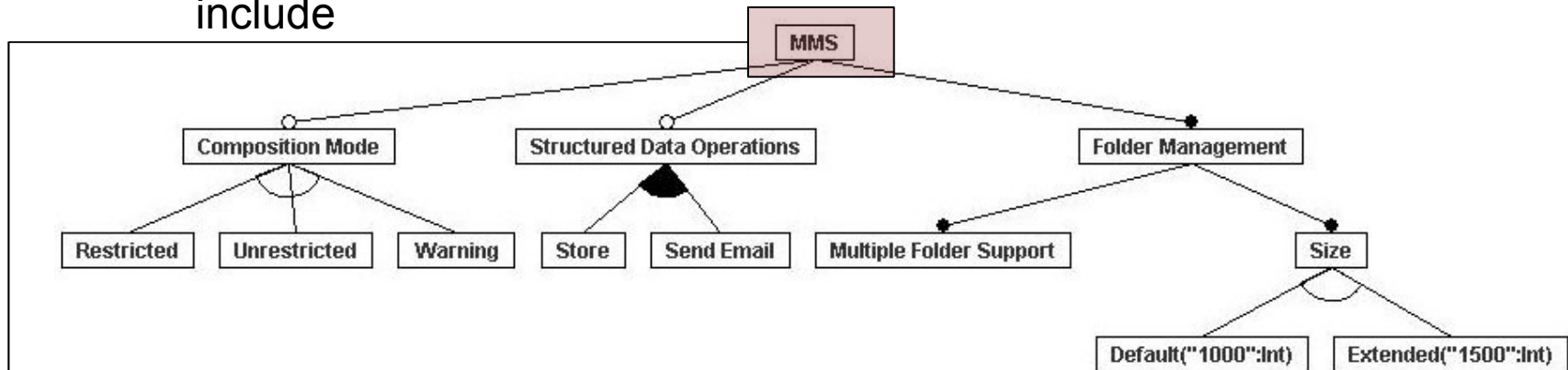
- Modelagem de features usada na definição do espaço de variações
- Suporte a diferentes tipos de variação:
 - Parametrização,
 - Casos de uso, cenários e passos opcionais
- Features diretamente relacionadas aos artefatos

PLUSS



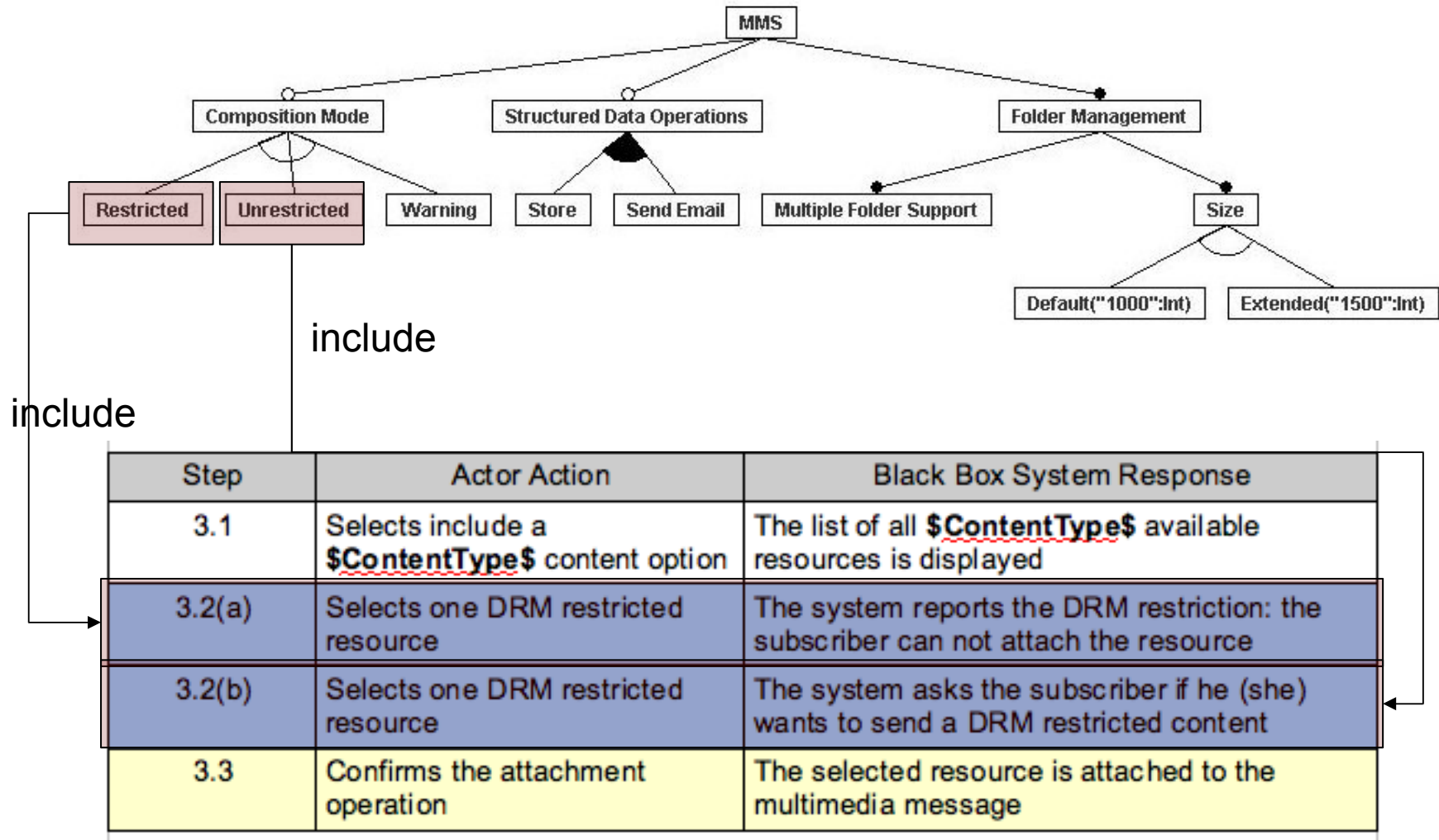
PLUSS

include

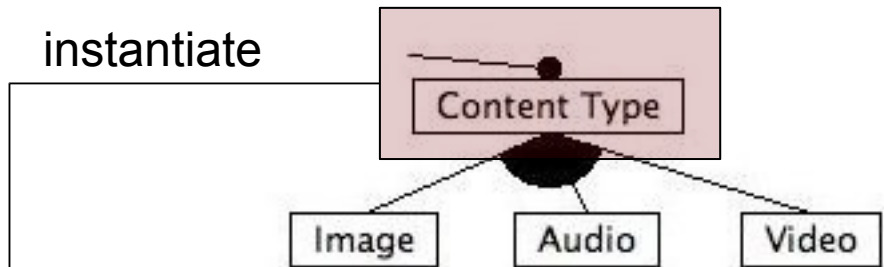


Step	Actor Action	Black Box System Response
1	Starts the message center application	Message center application is started
2	Selects create a new MMS option	The create a new MMS form is displayed
3	Fills in the message body	The message body is filled in
4	Selects the send message option	The recipient form is displayed
5	Fills in the recipient field	The recipient field is filled in
6	Selects the confirm option	The message is sent do the recipient and saved in the sent folder. The send message transient is displayed
7	Wait for the transient	The application returns to the message center

PLUSS



PLUSS



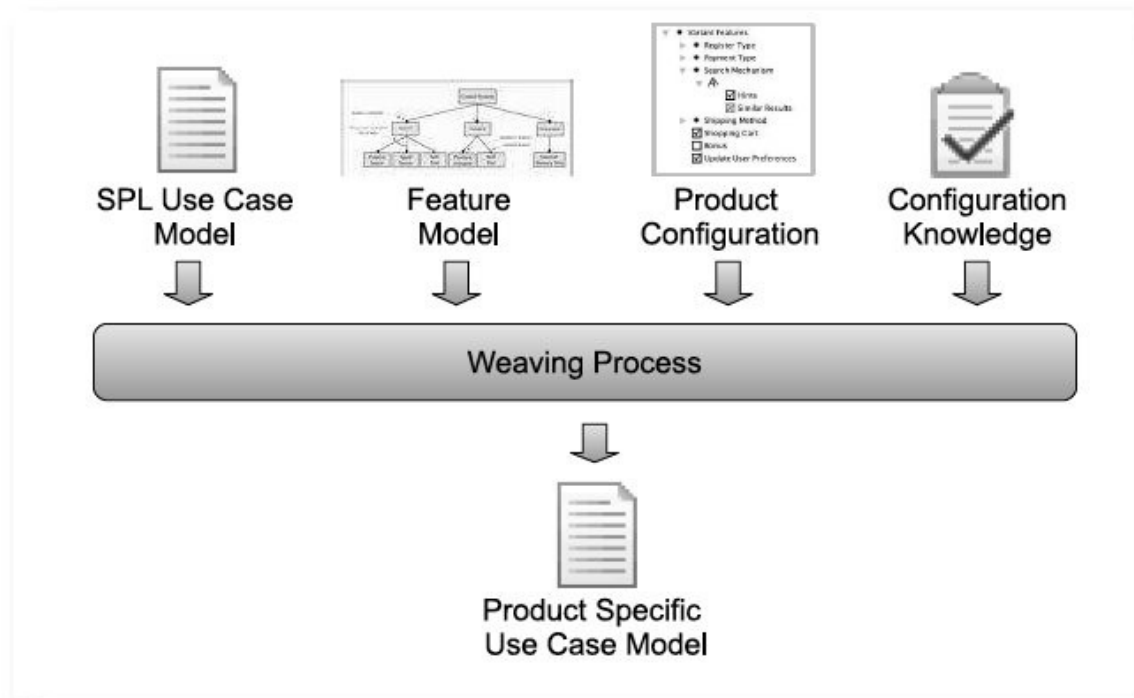
Step	Actor Action	Black Box System Response
3.1	Selects include a <u>\$ContentType\$</u> content option	The list of all <u>\$ContentType\$</u> available resources is displayed
3.2(a)	Selects one DRM restricted resource	The system reports the DRM restriction: the subscriber can not attach the resource
3.2(b)	Selects one DRM restricted resource	The system asks the subscriber if he (she) wants to send a DRM restricted content
3.3	Confirms the attachment operation	The selected resource is attached to the multimedia message

VM as Crosscutting

- Clara separação entre gerência de variações e casos de uso
- Suporte a diferentes tipos de variação
 - Casos de uso e cenários opcionais
 - Composição (quantificada) de cenários
 - Parametrização

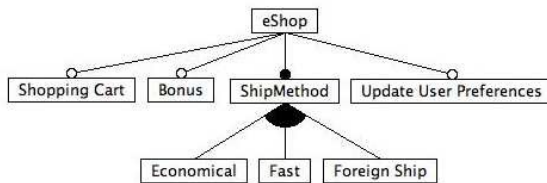
VM as Crosscutting

- Abordagem como um mecanismo crosscutting



VM as Crosscutting

Feature Model



Product Configuration



Configuration Knowledge

Expression	Required Artifacts
eShop	Proceed to Purchase Search for Products ...
not (Cart and Bonus) Cart and Bonus	Buy a Product Buy Products with Cart
Update Preferences	Register user Preferences
...	...

Scenarios

Description: Buy a specific product
From step: IDLE
To step: P1

Id	User Action	System Response
B1	Select the buy product option.	Present the selected product. The user can change the quantity of items he wants to buy. Calculate and show the amount to be paid.
B2	Select the confirm option.	Request payment information.

Description: Proceed to purchase
From step: B2, V2
To step: END

Id	User Action	System Response
P1	Fill in the requested information and select the proceed option.	Request the shipping method and address.
P2	Select one of the available ship methods (<ShipMethod>), fill in the destination address and proceed.	Calculate the shipping costs.
P3	Confirm the purchase.	Execute the order and send a request to the Delivery System to dispatch the products. [RegisterPreference]

VM as Crosscutting

Description: Buy a specific product

From step: IDLE

To step: P1

Id	User Action	System Response
B1	Select the buy product option.	Present the selected product. The user can change the quantity of items he wants to buy. Calculate and show the amount to be paid.
B2	Select the confirm option.	Request payment information.

Description: Buy products using a shopping-cart

From step: IDLE

To step: P1

Id	User Action	System Response
V1	Select the checkout option.	Present the items in the shopping cart and the amount to be paid. The user can remove items from the shopping cart.
V2	Select the confirm option.	Request bonus and payment information.

VM as Crosscutting

Description: Search for Products scenario
From step: IDLE
To step: END

Id	User Action	System Response
...
S3	Inform the search criteria.	Retrieve the products that satisfy the search criteria. Show a list with the resulting products. [RegisterPreference]

Description: Register user preferences.
From step: [RegisterPreference]
To step: END

Id	User Action	System Response
R1	-	Update the preferences based on the search results or purchased items.

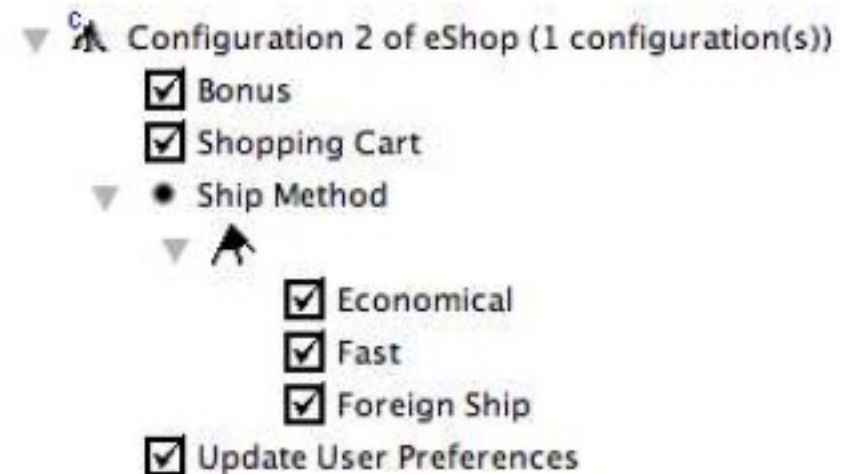
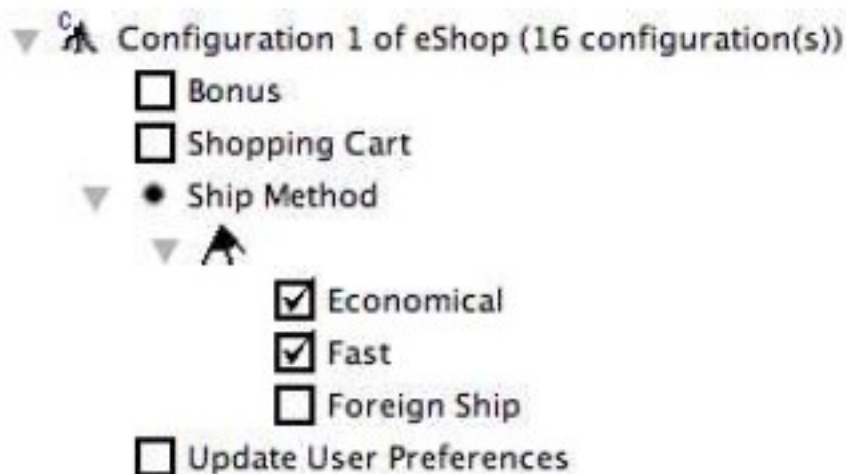
VM as Crosscutting

Description: Proceed to purchase
From step: B2, V2
To step: END

Id	User Action	System Response
P1	Fill in the requested information and select the proceed option.	Request the shipping method and address.
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VM as Crosscutting

Expression	Required Artifacts
eShop	Proceed to Purchase Search for Products ...
not (Cart and Bonus)	Buy a Product
Cart and Bonus	Buy Products with Cart
Update Preferences	Register user Preferences
...	...

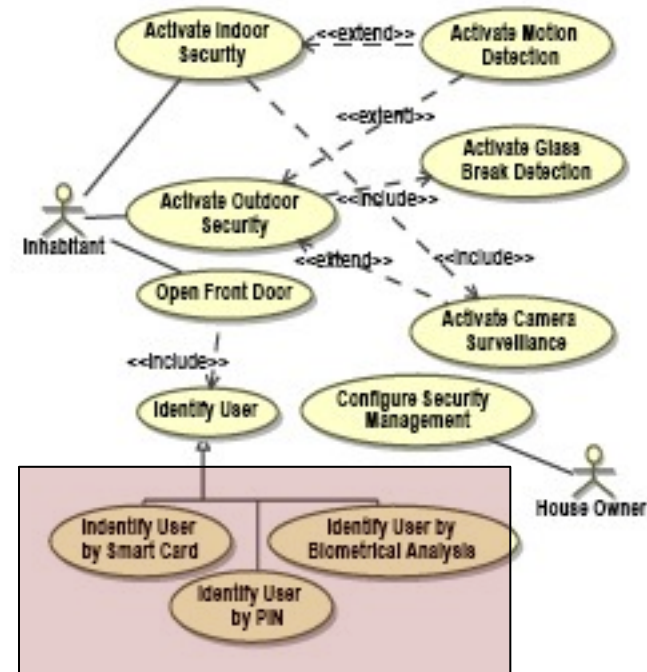
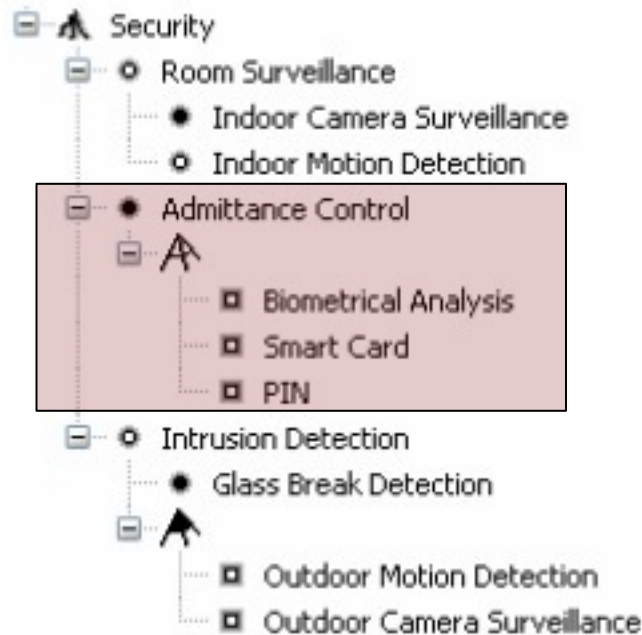


AMPLE Approach

- Abordagem centrada em modelos
- Foco principal em rastreabilidade
- Suporte a diferentes tipos de variação
 - Casos de uso opcionais
 - Composição de cenários (representados em diagramas de atividades)

AMPLE Approach

- Features e Casos de Uso



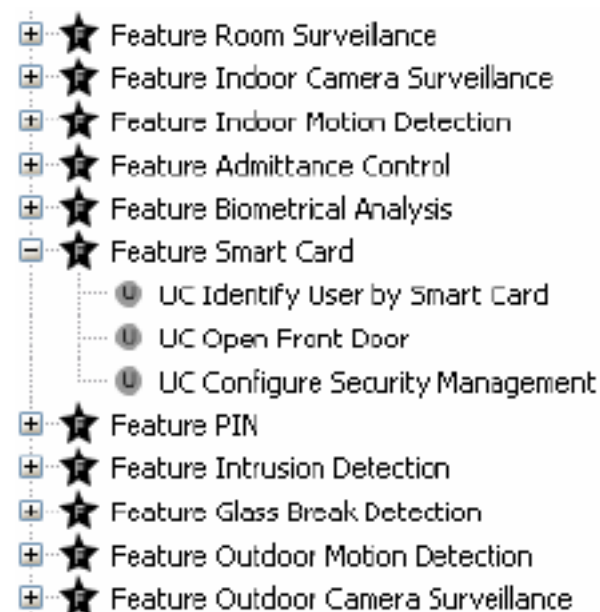
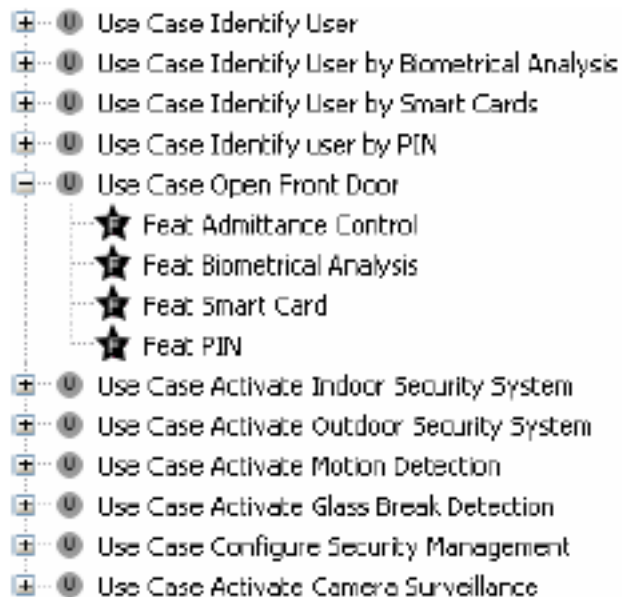
AMPLE Approach

- Modelo de configuração

Use Cases Features	Identify User	Identify User by Biometrical Analysis	Identify User by Smart Card	Identify User by PIN	Open Front Door	Activate Indoor Security	Activate Outdoor Security	Activate Motion Detection	Activate Glass Break Detection	Activate Camera Surveillance	Configure Security Management
Room Surveillance						x		x		x	x
Indoor Camera Surveillance						x				x	x
Indoor Motion Detection						x		x			x
Admittance Control	x				x						x
Biometrical Analysis		x			x						x
Smart Card			x		x						x
PIN				x	x						x
Intrusion Detection							x				x
Glass break detection							x		x		x
Outdoor Motion Detection							x	x			x
Outdoor Camera Surveillance							x			x	x

AMPLE Approach

- Visões de rastreabilidade



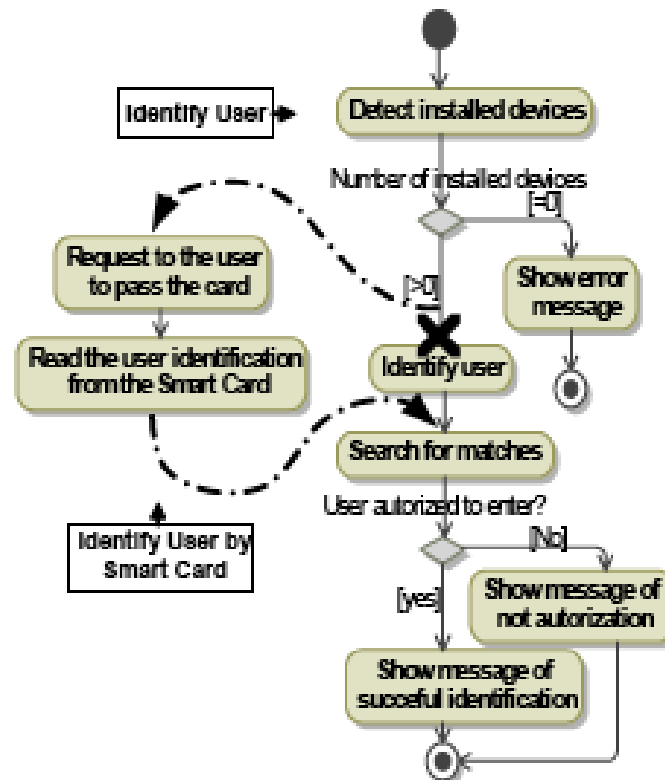
AMPLE Approach

- Regras de composição
 - Replace with
 - Insert before / after
- Semântica ainda não bem definida

Replace with

Compose Identify User **with** Identify User by Smart Card

Replace Identify User **with** Identify User by Smart Card



Replace with

Compose Identify user **with** Open front door
Insert Open front door **after**
Show message of successful identification
Insert Close front door **before** FinalState

