
Product Derivation with Requirement Models

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Outline

- Introduction
 - Problem Description
 - Template-based Approach
 - Model-based Approach
 - Challenges
 - Benefits
 - Questions
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Introduction

- Impact of assembly line
- "Mass customization" paradigm
- Reuse certain parts for other models



"Can one produce software like cars?"

Problem Description

- Complex domain
- Many constraints
- Risk of dead end configurations
- Different situations lead to different Requirement models

=> How can we produce requirement models that represent the actual system

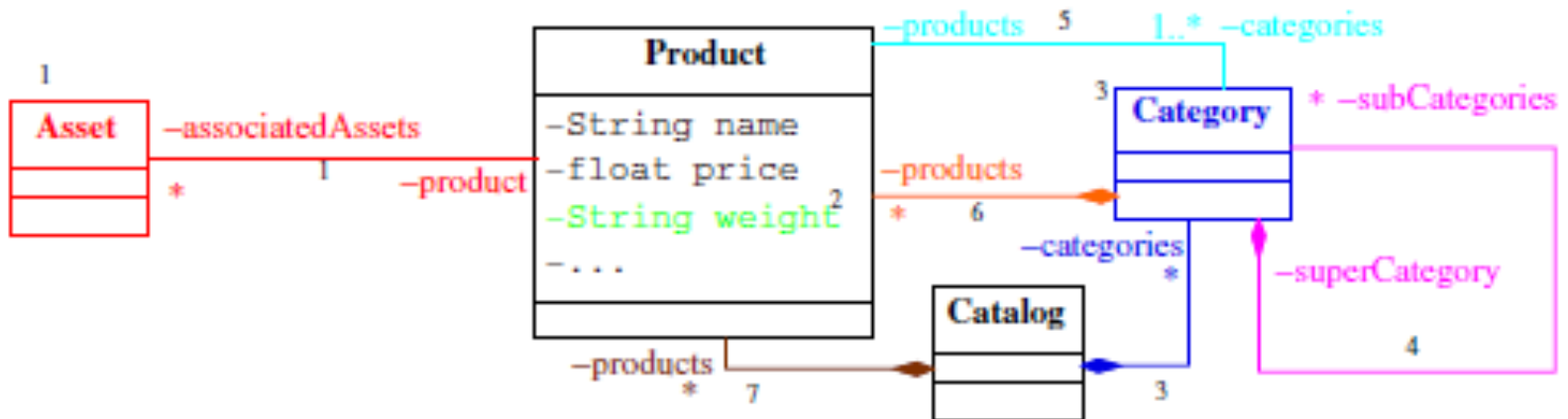
Template-based Approach

- Works with various UML diagram
 - A Feature model consists of
 - Templates (annotated diagram)
 - Instances
 - Both need to be of the same type
 - Templates are annotated with
 - Presence Conditions
 - Meta Expressions
-

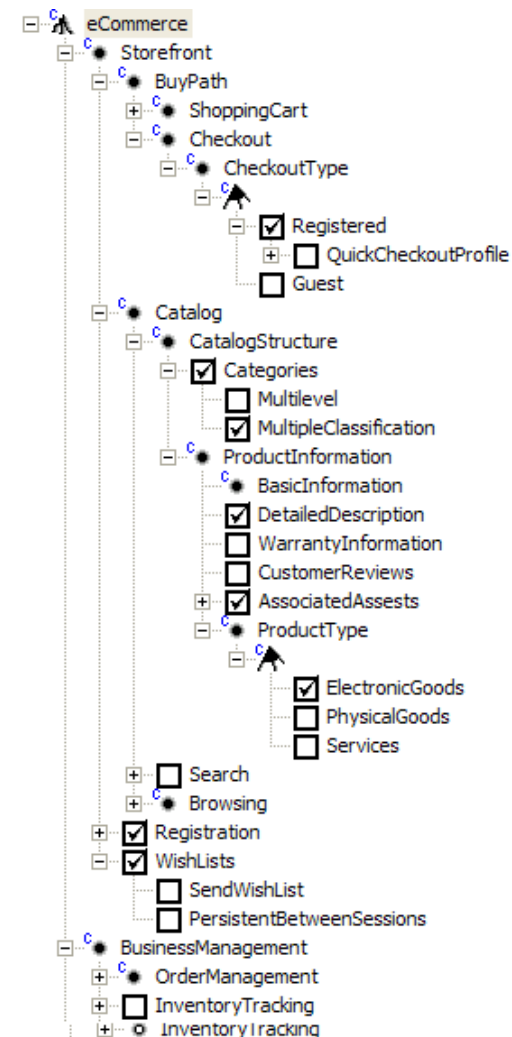
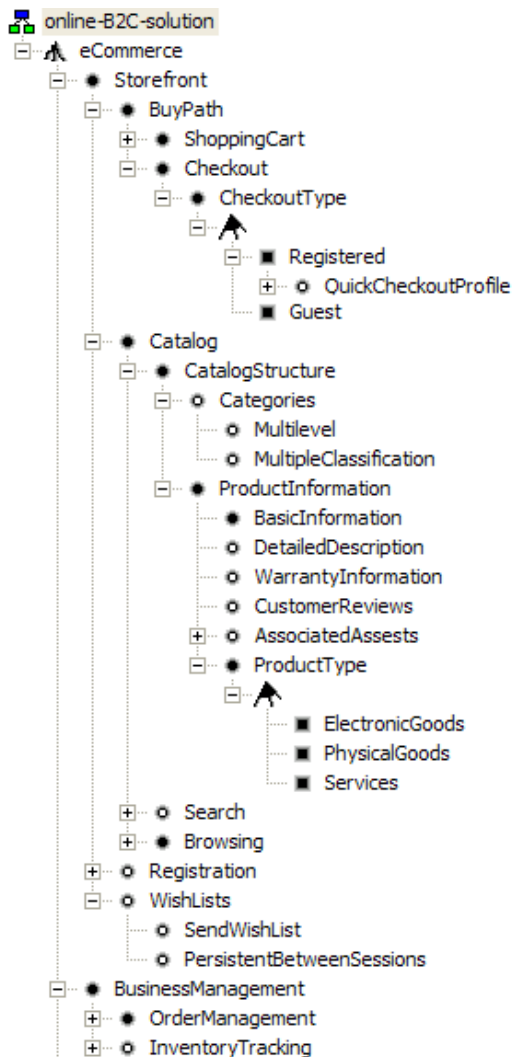
Annotated Class Diagram

Presence conditions:

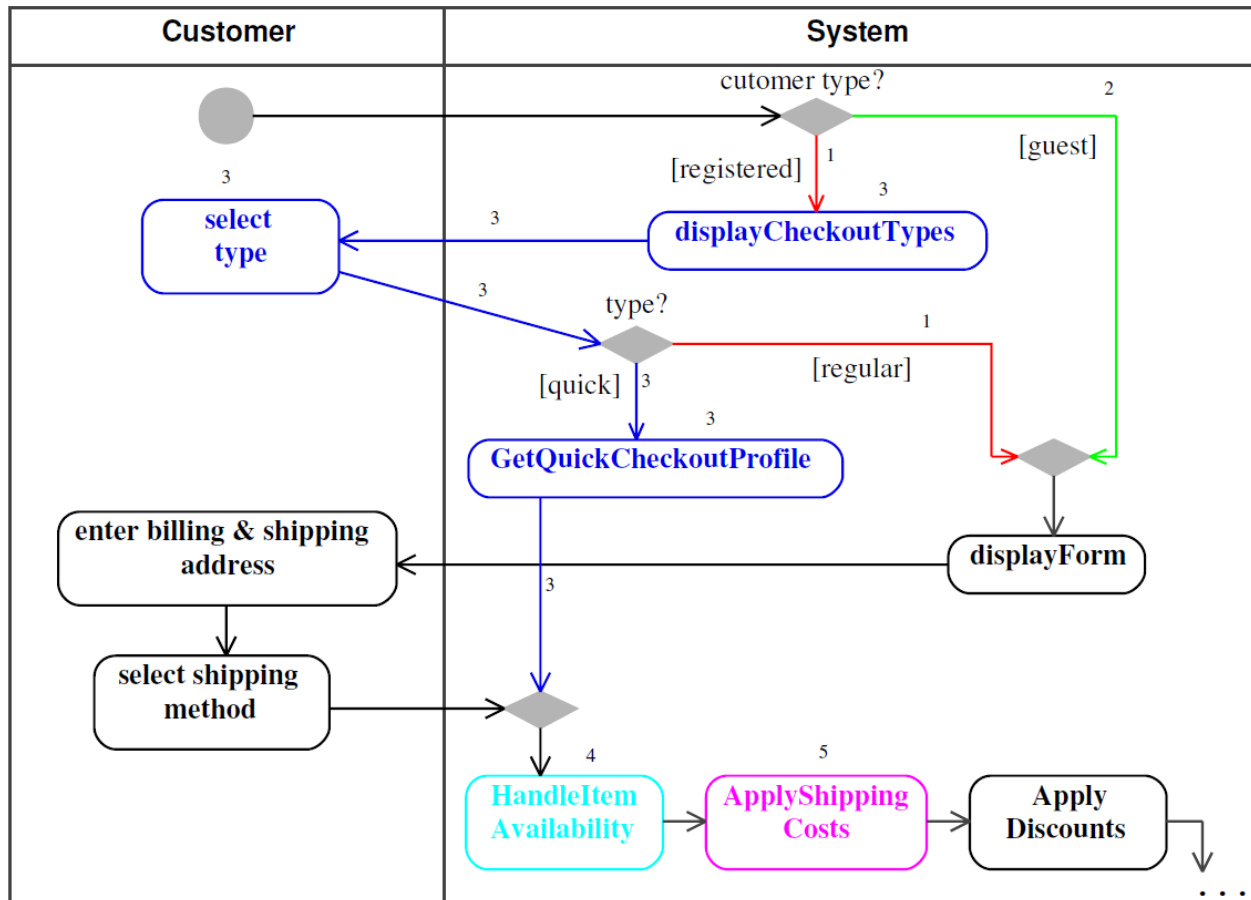
true		MultiLevel		4
AssociatedAssets		MultipleClassification		5
PhysicalGoods		Categories & !MultipleClassification		6
Categories		MultipleClassification ! !Categories		7



Feature modelling



Activity Diagram - Template



Presence conditions:

true

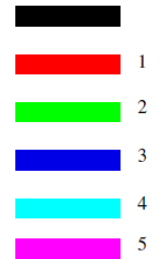
Registered

Guest

QuickCheckoutProfile

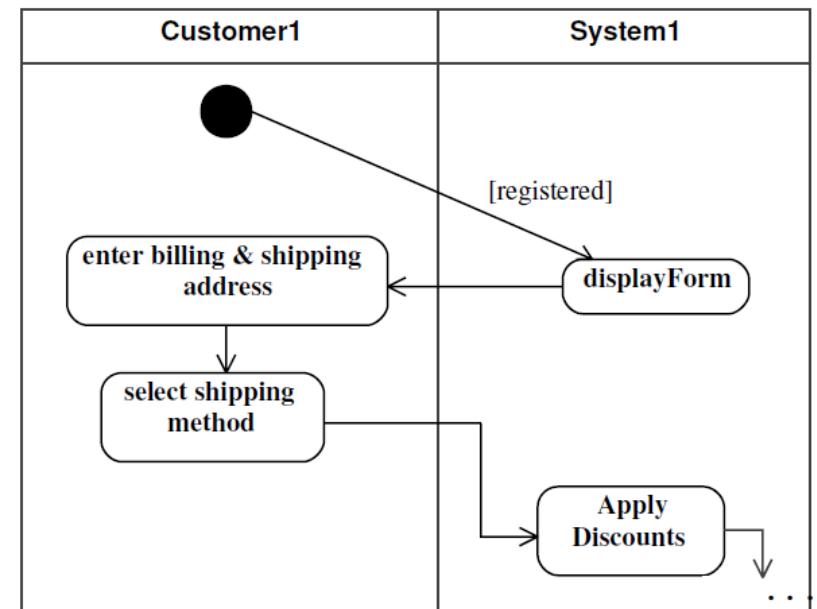
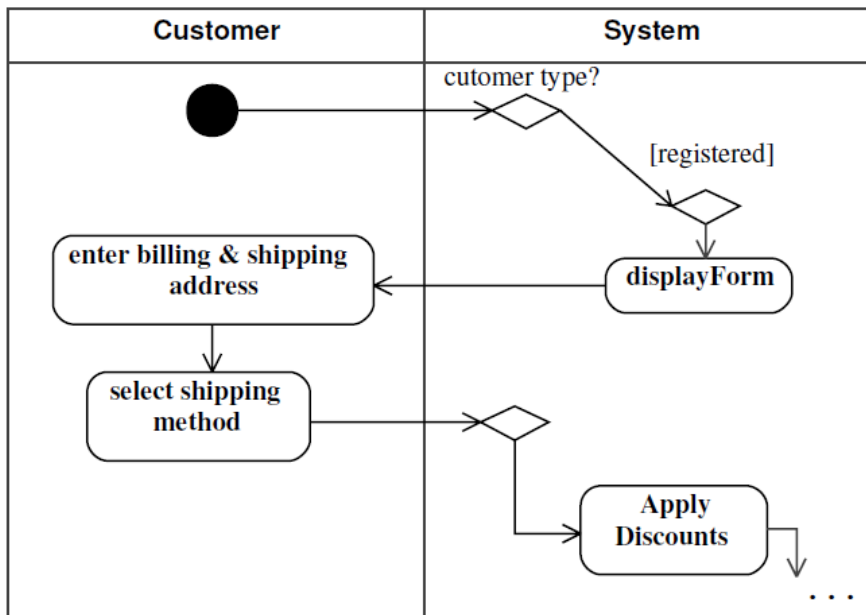
InventoryTracking

PhysicalGoods



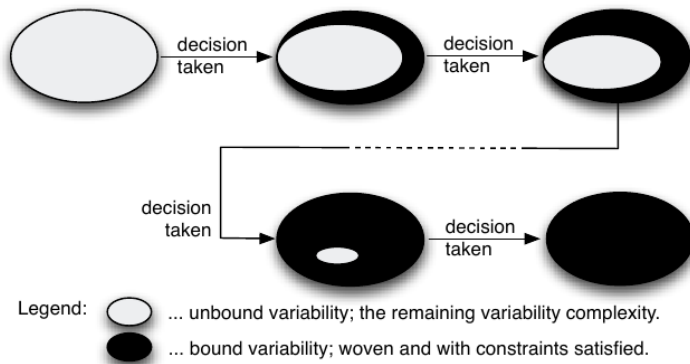
Activity Diagram - Instances

Removal Analysis & Simplification

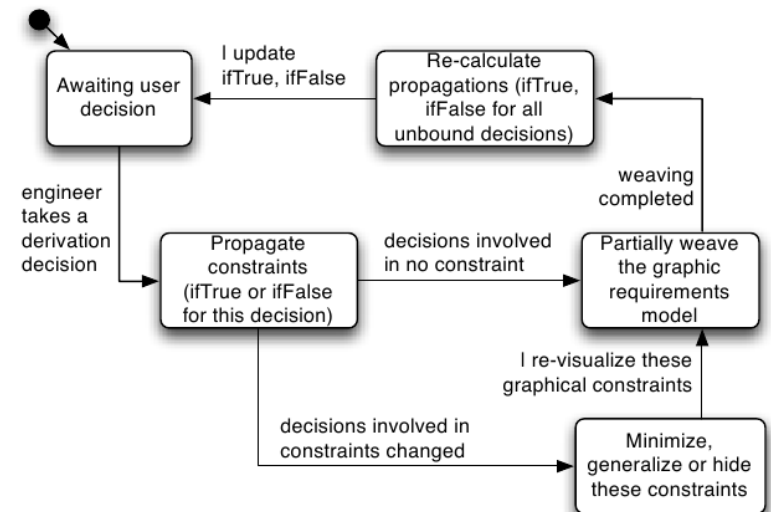


ADORA-based Approach

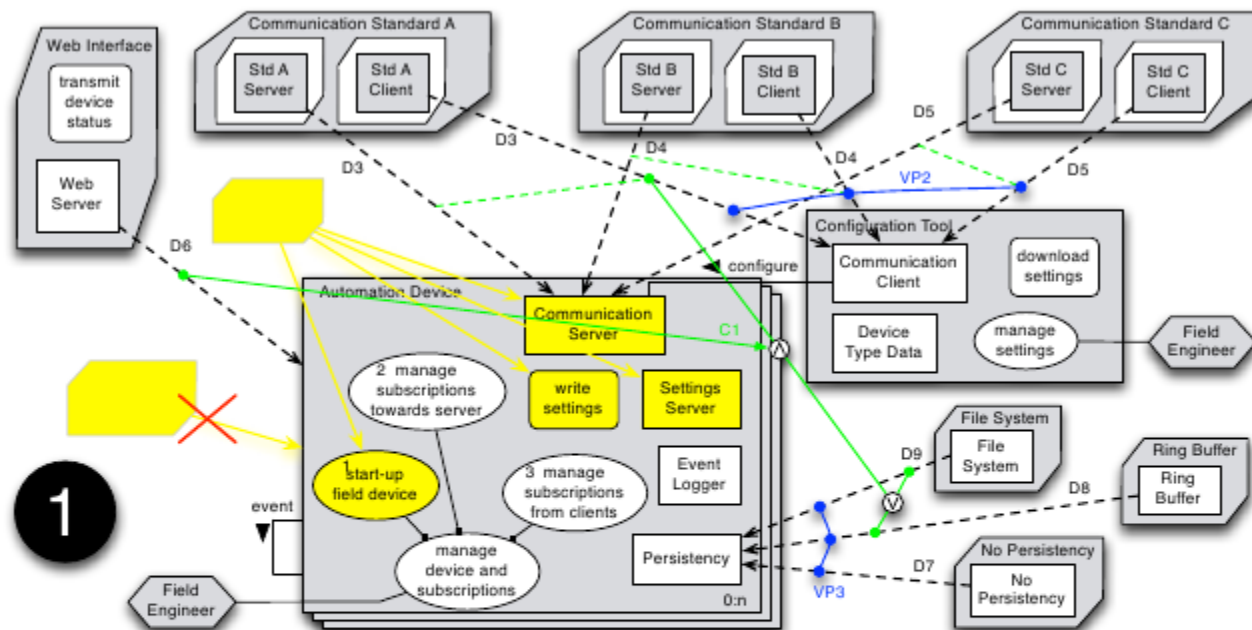
What we want to achieve:



How to get there:

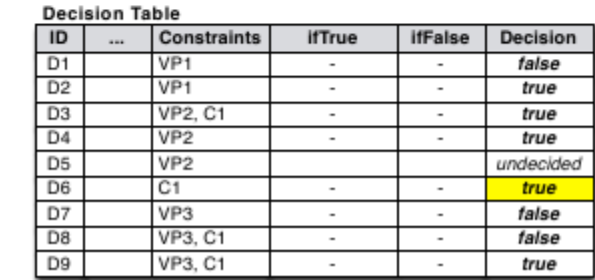


Adora Example Beginning...



Decision Table

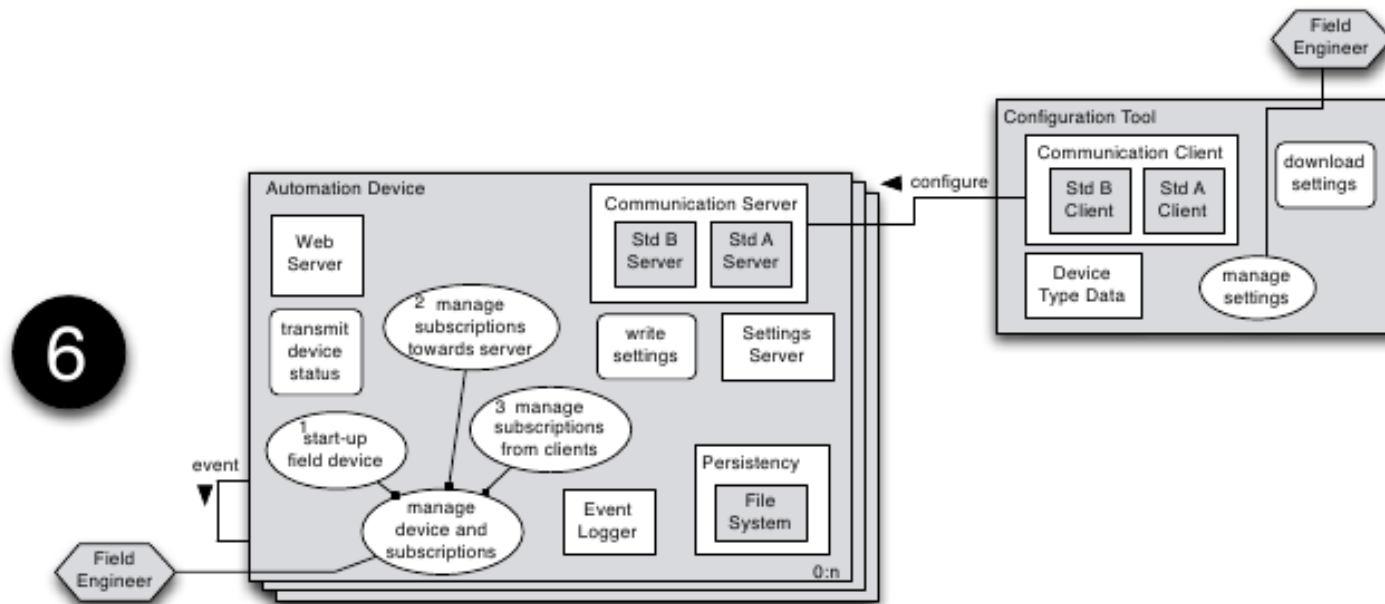
ID	...	Constraints	IfTrue	IfFalse	Decision
D1		VP1	-	-	false
D2		VP1	-	-	true
D3		VP2, C1		~D6	undecided
D4		VP2			undecided
D5		VP2			undecided
D6		C1	D3 ~D7		undecided
D7		VP3	~D6 ~D8 ~D9		undecided
D8		VP3, C1	~D7 ~D9		undecided
D9		VP3, C1	~D7 ~D8		undecided



ID	...	Constraints	IfTrue	IfFalse	Decision
D1		VP1	-	-	<i>false</i>
D2		VP1	-	-	<i>true</i>
D3		VP2, C1	-	-	<i>true</i>
D4		VP2	-	-	<i>true</i>
D5		VP2			<i>undecided</i>
D6		C1	-	-	<i>true</i>
D7		VP3	-	-	<i>false</i>
D8		VP3, C1	-	-	<i>false</i>
D9		VP3, C1	-	-	<i>true</i>

Adora Example

...end result



Decision Table

ID	...	Constraints	ifTrue	ifFalse	Decision
D1		VP1	-	-	false
D2		VP1	-	-	true
D3		VP2, C1	-	-	true
D4		VP2	-	-	true
D5		VP2	-	-	false
D6		C1	-	-	true
D7		VP3	-	-	false
D8		VP3, C1	-	-	false
D9		VP3, C1	-	-	true

Benefits

- Visualize complexity
- Tool support
- Represent the actual system instead of an adapted domain diagram
- Interdependencies can be detected and handled

=> faster, less error-prone product derivation

Challenges

- Template-Based approach:
 - One feature is scattered over multiple diagrams
 - Use of constraints is limited
 - Meta-model need expertise
-> adapt to language
 - Learning ADORA language
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Questions

Thanks for your attention!

Please ask questions.....
