Internet Applications Design and Implementation

2015 - 2016 - 1st edition

MIEI - Integrated Master in Computer Science and Informatics

Specialization block

João Costa Seco (joao.seco@fct.unl.pt)
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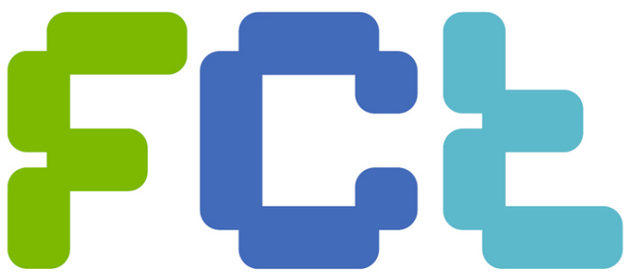

FACULDADE DE
CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

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(Modeling Interface & Interaction - IFML)

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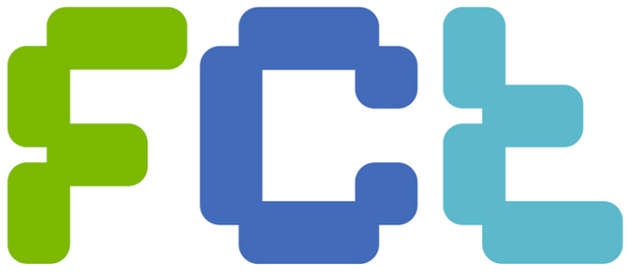

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Some slides are adapted from http://goo.gl/ayglEL

Question

How do you specify the interaction of your web application?

How do you specify its views?

How do you specify how users navigate in it?

Answer(s)

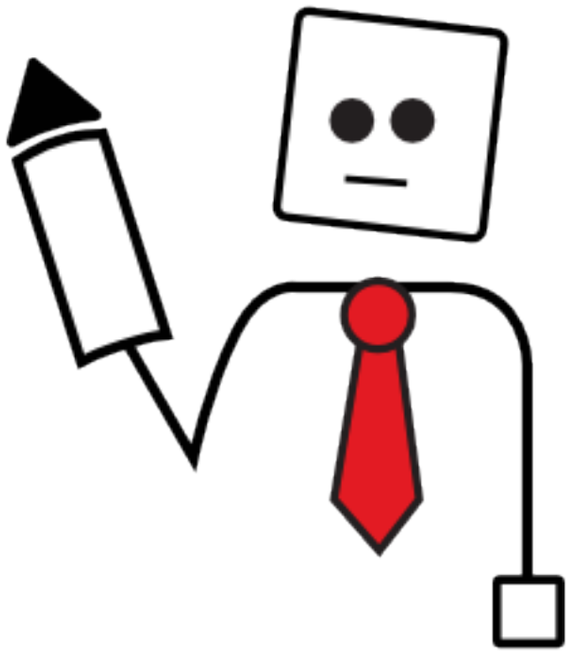
You don’t!

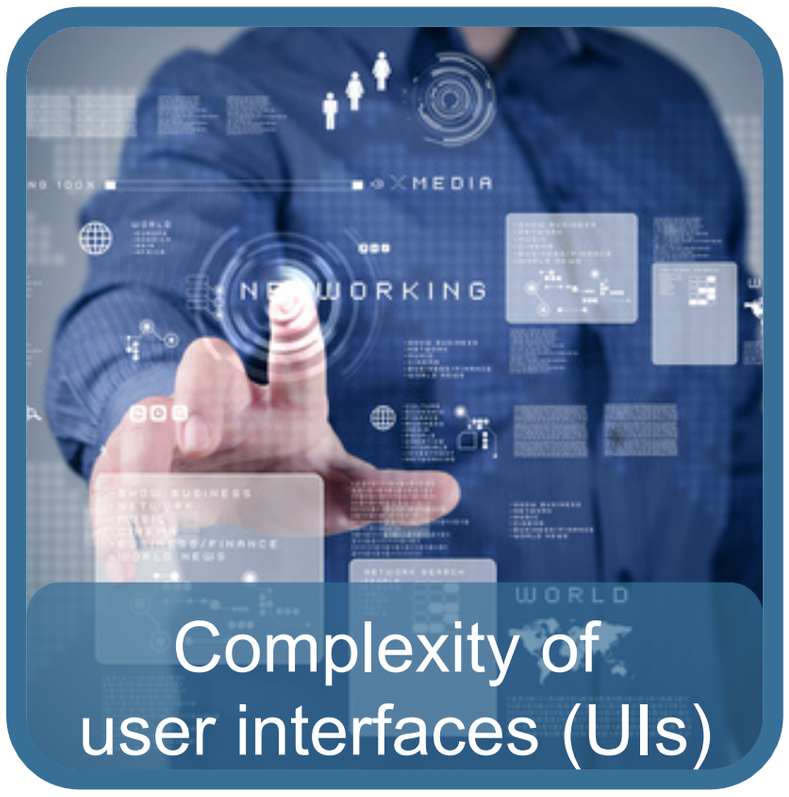
You code!

go to here
<form action=“jumptohere”…>…</form>

The UI Design Problem

Costly and Inefficient process





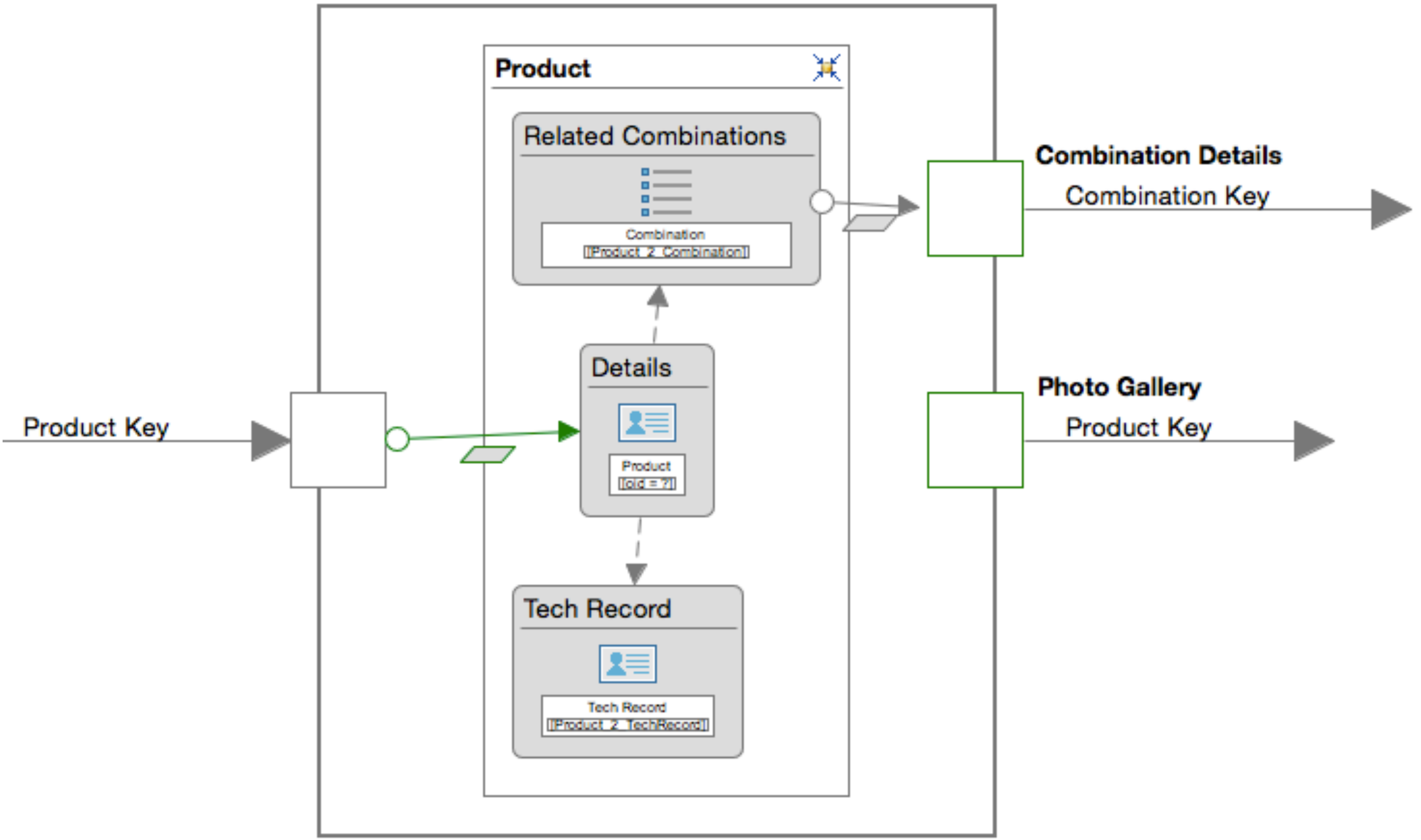
Complexity of user interfaces (UIs)

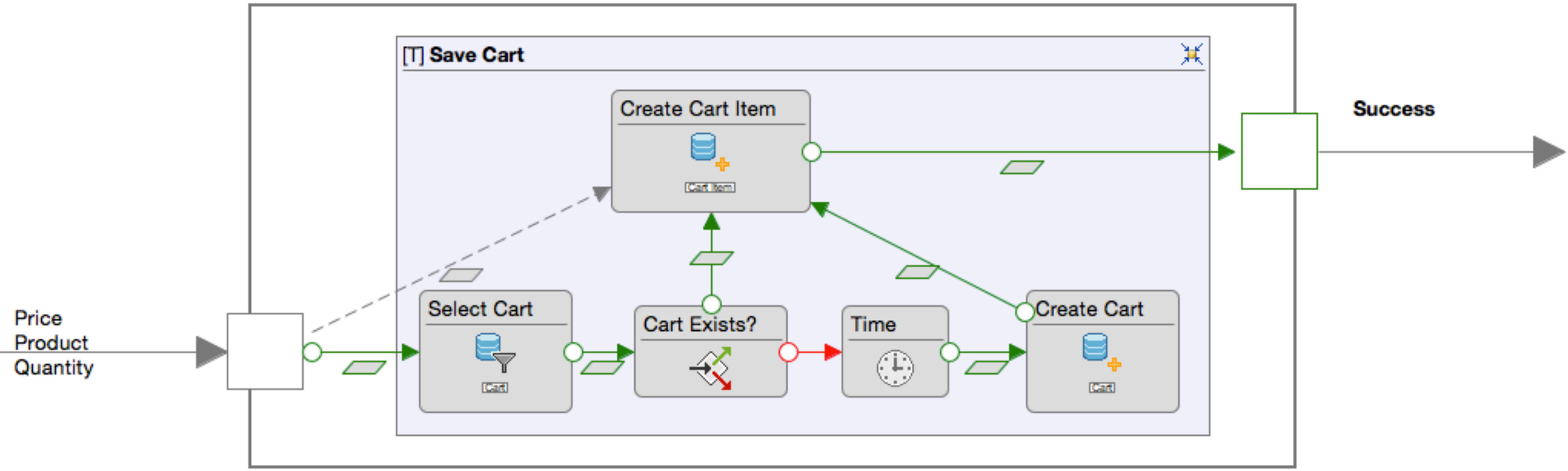
Ineffective tools

Manual development

No MDE technology

Solution: Abstracting!




[T] Save Cart
Create Cart Item
Cart Item
Success
Price
Product
Quantity
Select Cart
Cart
Cart Exists?
Time
Create Cart
Cart

The Interaction Flow Modeling Language

The new OMG Standard for integrating the front-end design in your system and enterprise models

- OMG (Object Management Group) standard (since 03/2013)

- To express content, user interaction, and control behavior of front-end apps.

Practical Results of Having a Standard

- An official **metamodel/grammar ofa the language** which describes the semantics of and relations between the modeling constructs
- A **graphical concrete syntax for the interaction flow notation** which provides an intuitive representation of the user interface composition, interaction and control logic for the front-end designer
- A **UML Profile** consistent to the metamodel
- An **interchange format** between tools using XMI
- All this, specified through standard notations themselves

The UI Design solution: IFML

Platform independent description of UIs

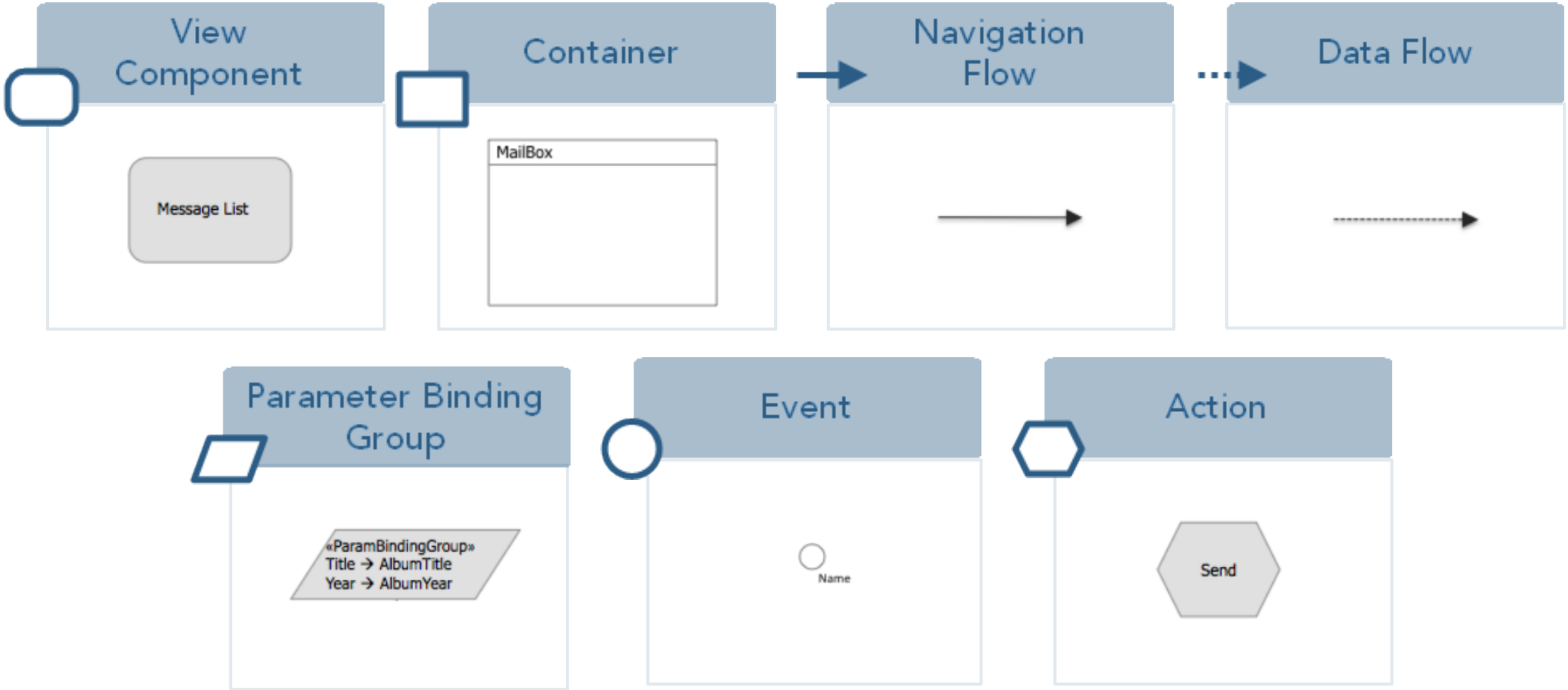
Focused on user interactions

No definition of graphics and styles

Reference external models

Slide from http://goo.gl/ayglEL

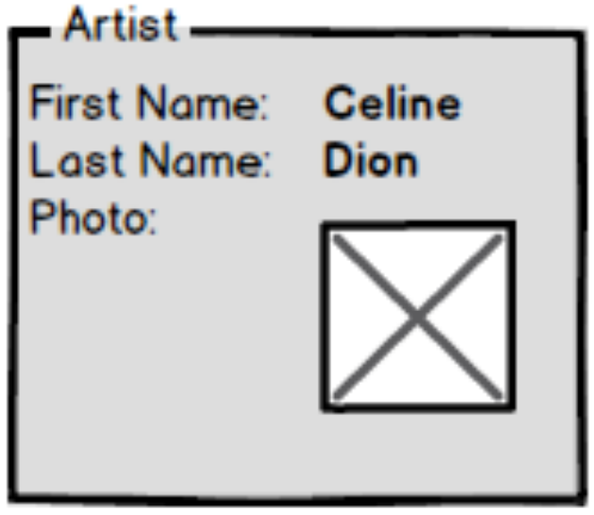
IFML Essentials



Covered aspects

- **Multiple views** for the same application
- **Visualization and input of data**, and production of **events**
- **Components** independent of concrete widgets and presentation
- **Interaction flow**, initiated by the user or by external events
- **Modularization** of the model (design-time containers for reuse purpose)
- User input **validation and constraints**, according to OCL or other existing constraint languages

IFML Syntax – View Components: Details

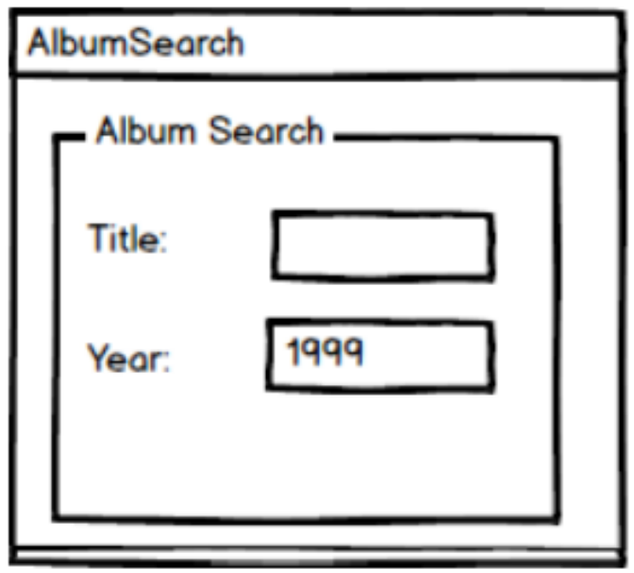


- User defines:
  - Entity (Artist in this case)
  - Shown attributes (e.g. id, name, photo, etc.)
  - Value to be shown (id = ?)
- Also available *Multiple Details* and *Scroller*

IFML Syntax – View Components: List

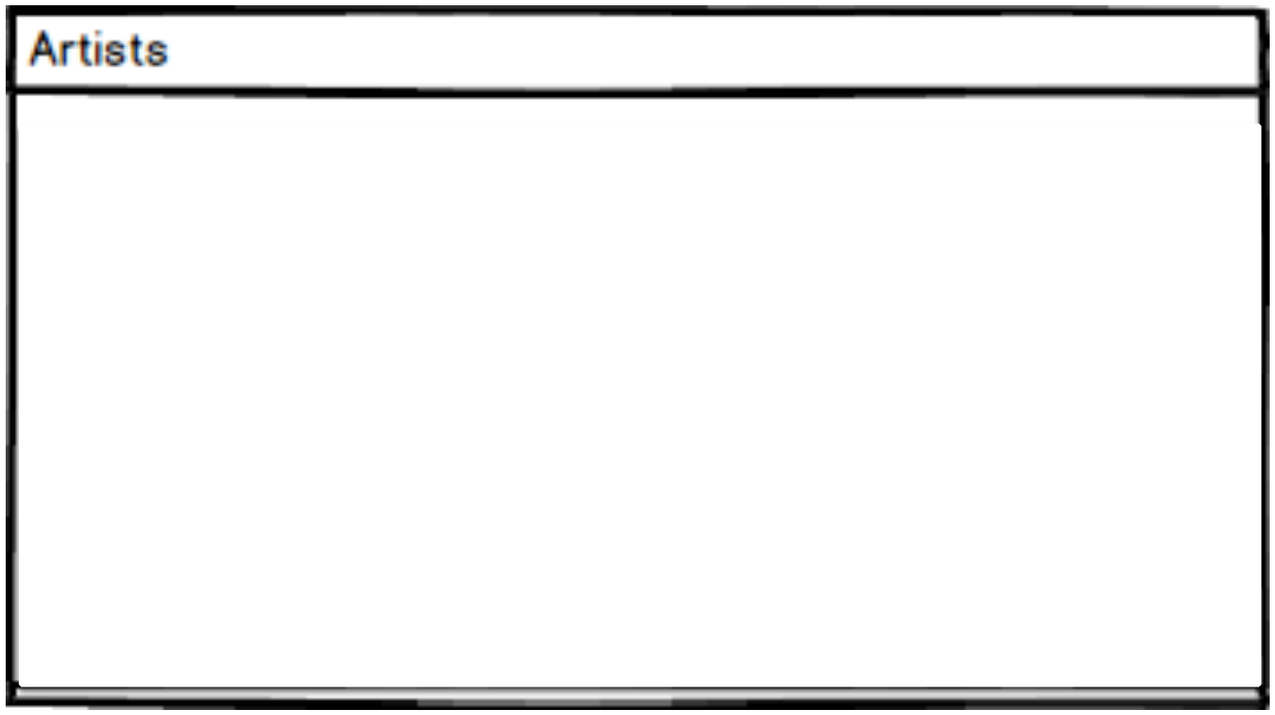
- User defines:
  - Entity (Artist in this case)
  - Shown attributes (e.g. id, name, etc.)
  - Selection criteria (… where X = Y)
- Also available *Checkable List*, *Hierarchical List*, etc.

IFML Syntax – View Components: Form



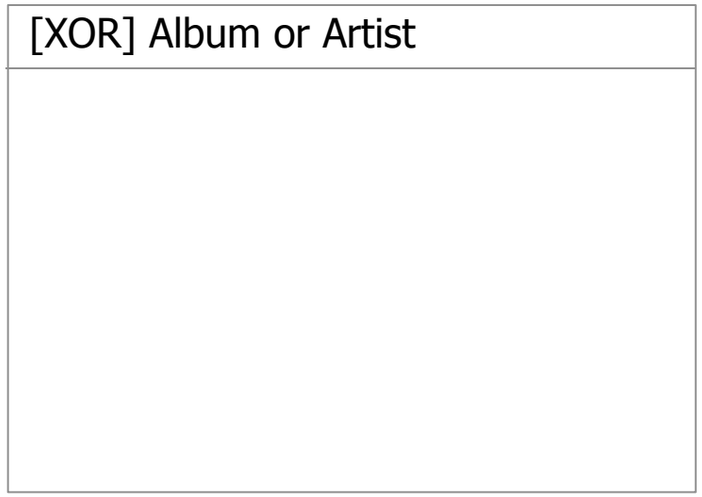
- User defines:
  - Entity, optionally (Album in this case)
  - Fields (e.g. title, year, etc.)
- Also available *Multiple Form*

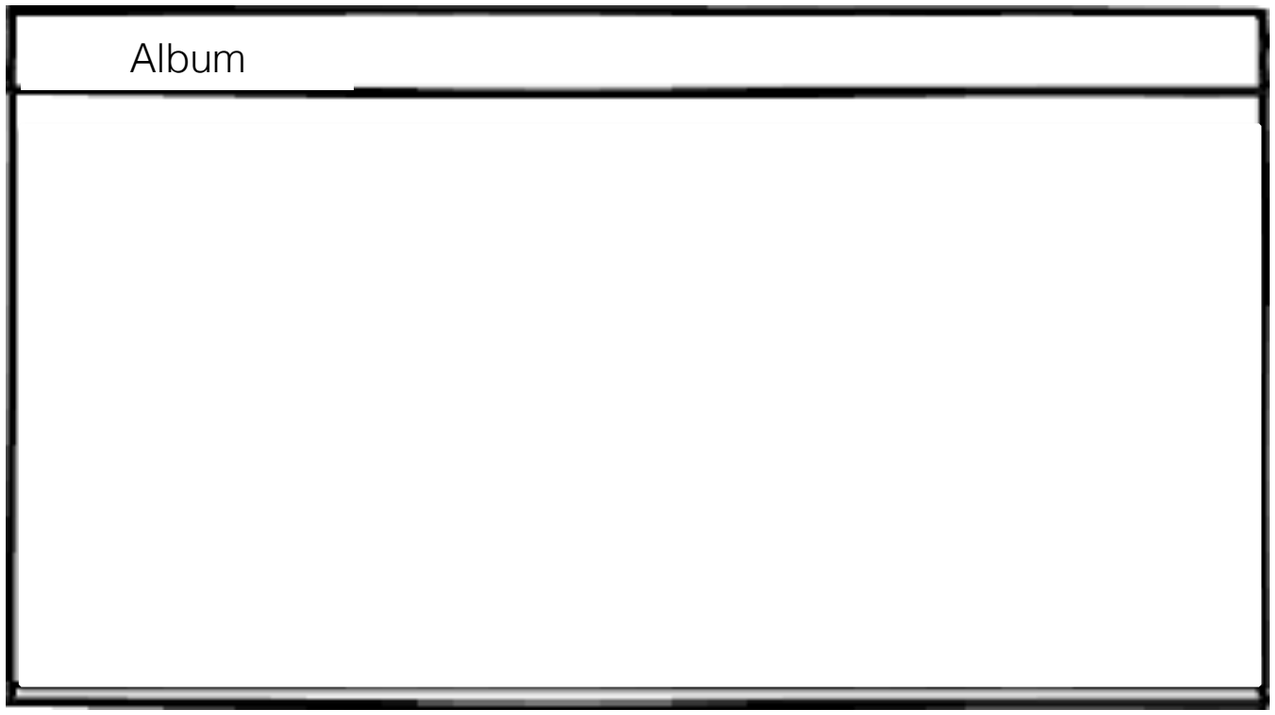
IFML Syntax – Containers: Page



- Container to hold other constructor (including other pages - nesting)
- Not necessarily mapped into web pages

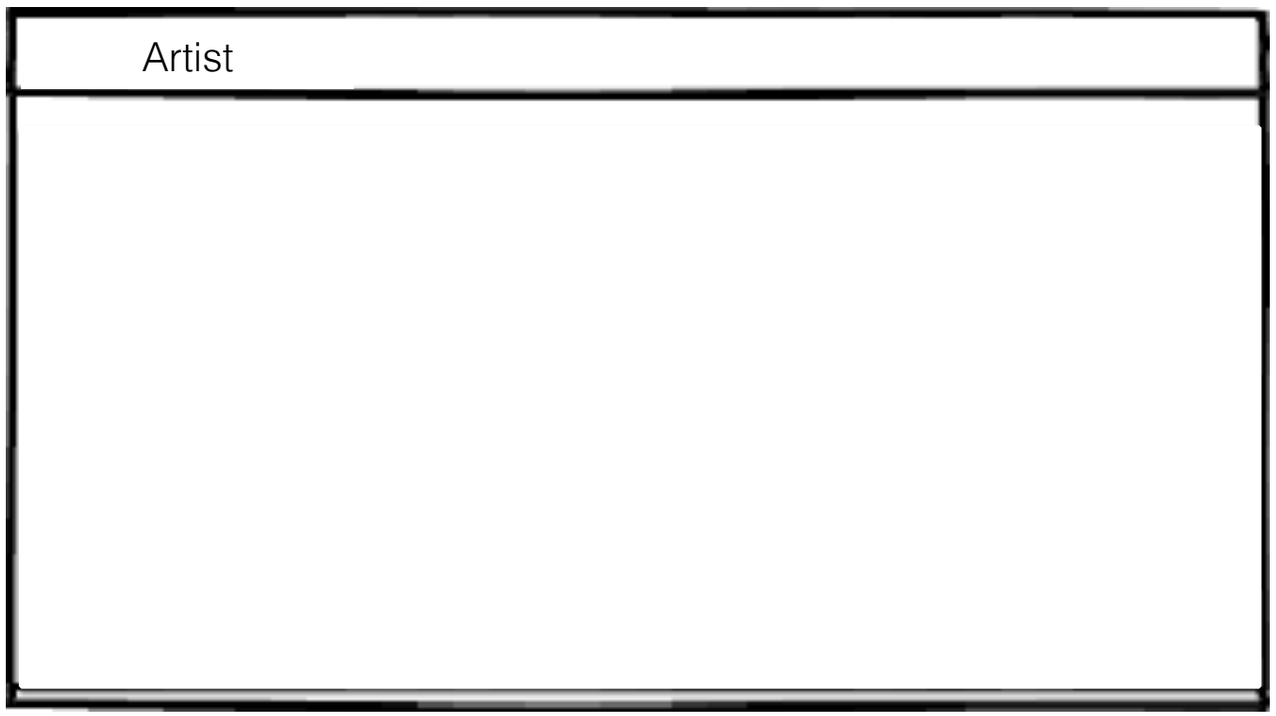
IFML Syntax – Containers: Alternative Page





- Container to hold other pages in XOR mode

- It either contains Album or Artist, not both at the same time (depends on navigation)



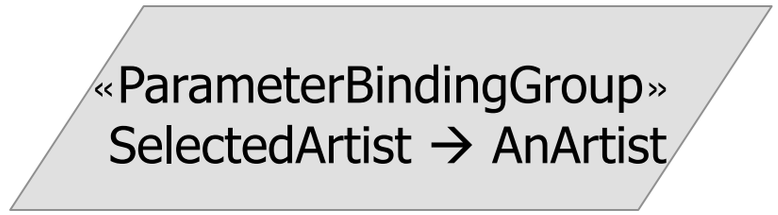
IFML Syntax – (User) Navigation Flow

- User defines:
  - Source (from where to navigate)
  - Target (to where to navigate)
  - Binding parameters/values
- Also available *OK Flow*, and *KO Flow*

IFML Syntax – Data Flow

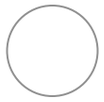
- User defines:
  - Source (from where to navigate)
  - Target (to where to navigate)
  - Binding parameters/values

IFML Syntax – Parameters Binding



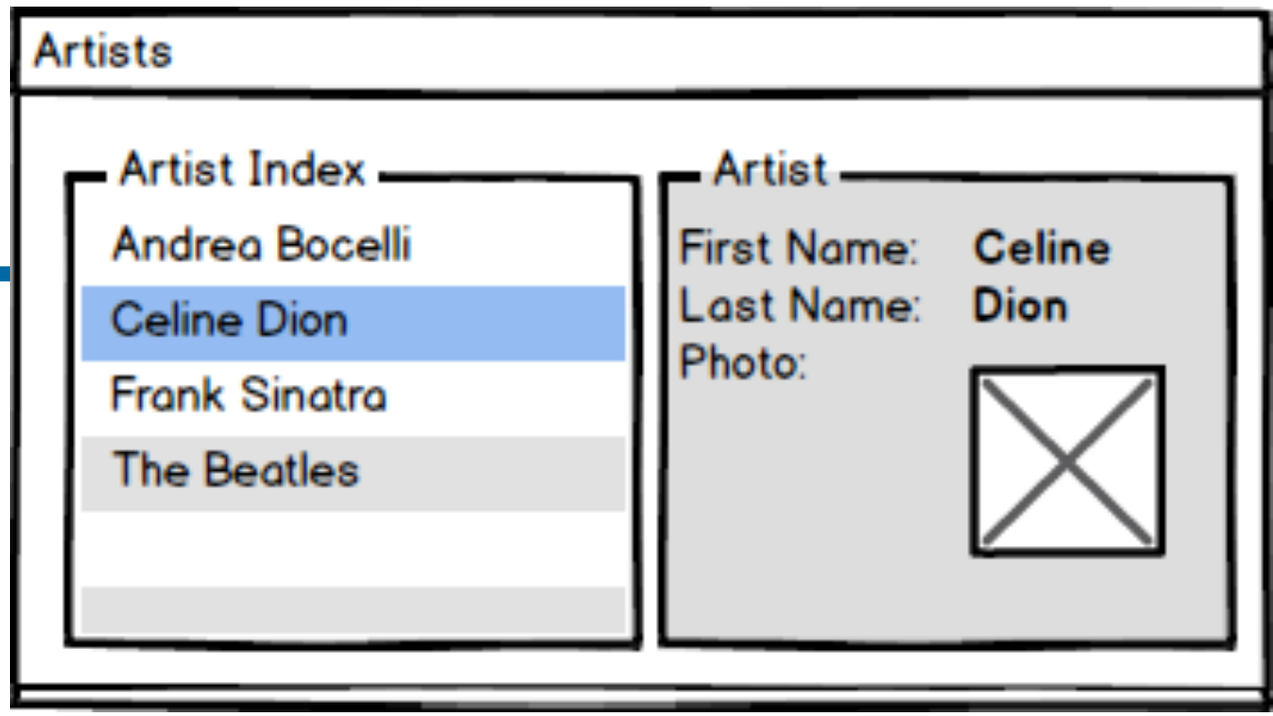
- User defines:
  - Source parameter/value (SelectedArtist in this case)
  - Target parameter/value (AnArtist in this case)
  - Data flows from source to target
  - Usually associated with flows (user navigation flow or data flow)

IFML Syntax – Events



- Created when user clicks on something
  - To select an element from a list
  - To navigate
  - Etc.

♪ All Together Now, All Together Now ♪



View Container

«ParameterBindingGroup»
SelectedArtist → AnArtist

Parameter Binding

Artists

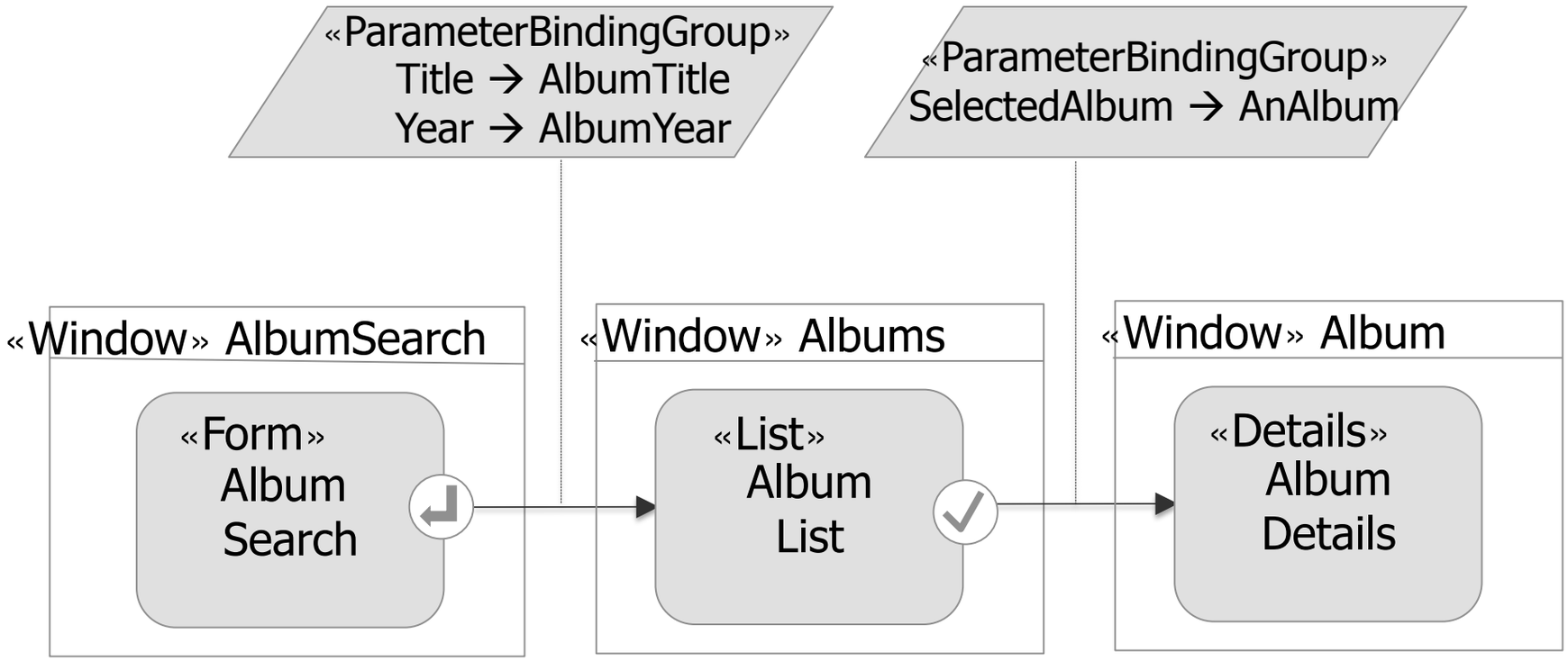
Artists List

Artist

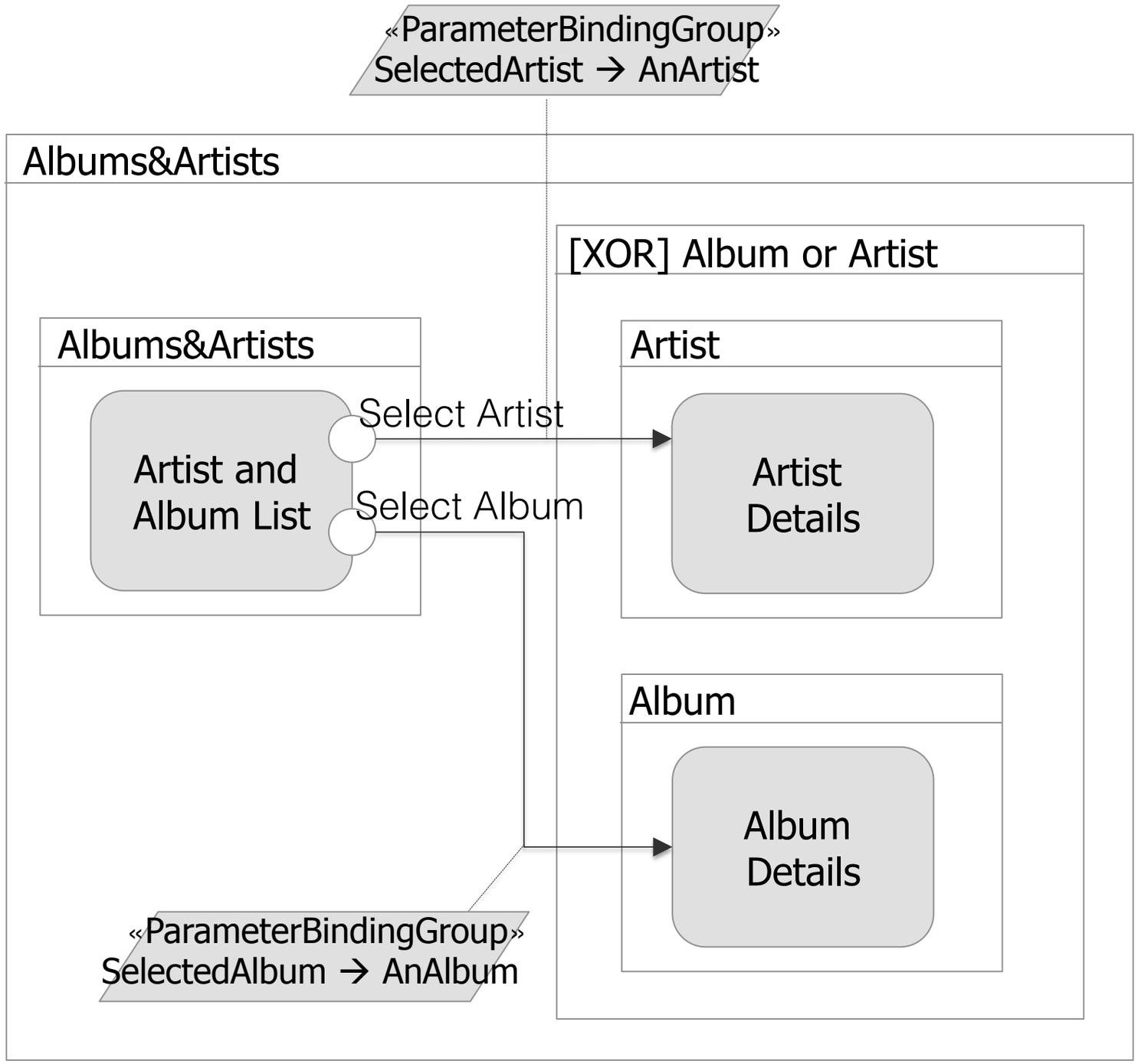
View Component

Event

IFML by example



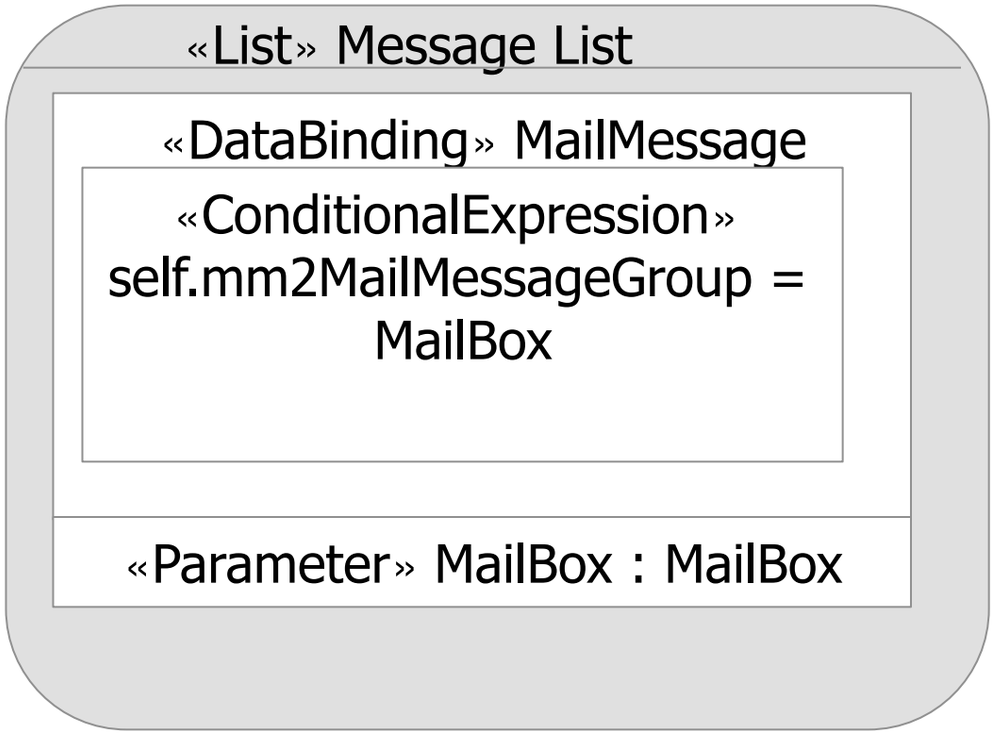
IFML by example



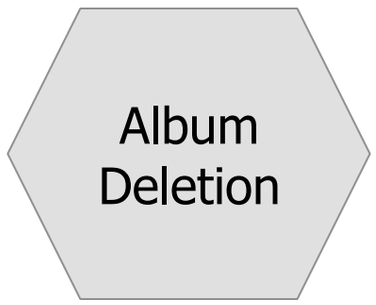
IFML – Adding Details to View Components

View Component Parts:

- Data binding
- Parameters

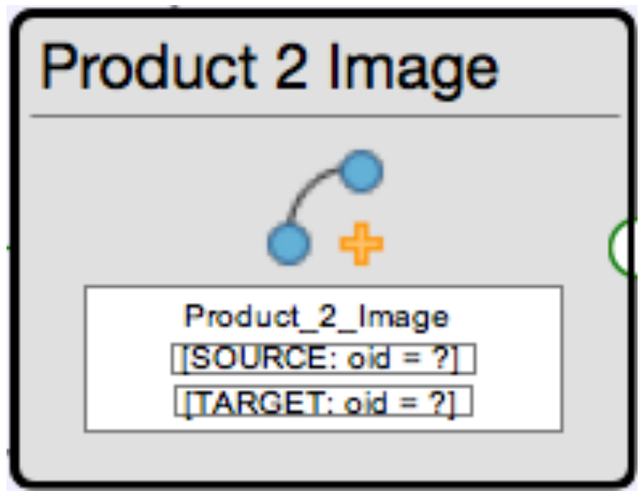


More IFML Syntax – Actions



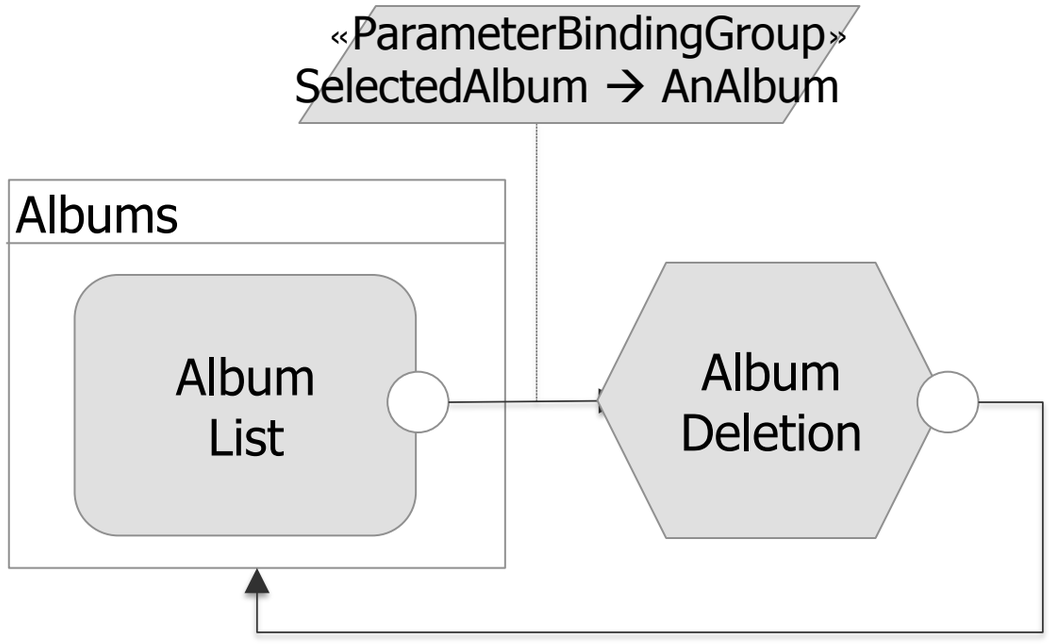
- Generic actions can be defined by the user
- Tool support adds a few very useful (next slide)

More IFML Syntax – Actions: Create, Connect

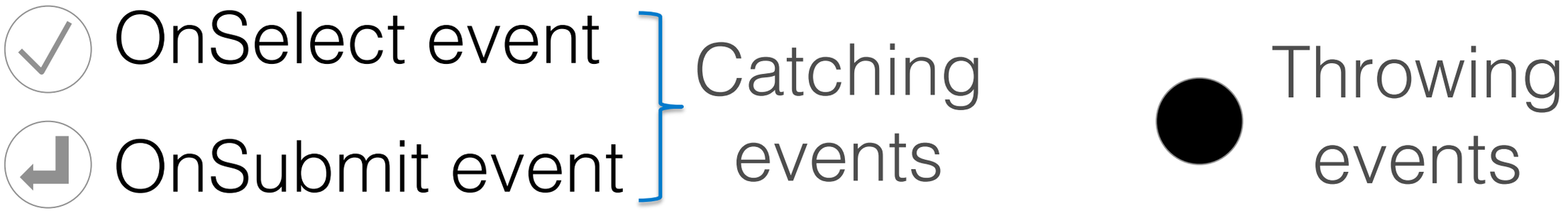


- Create
  - Creates an Entity entry (user selects entity)
    - Receives necessary data through flow and parameter binding
- Connect
  - Source entity entry (oid = ?)
  - Target entity entry (oid = ?)
  - Receives necessary data through flow and parameter binding
- More: *Delete*, *Edit*, *Disconnect*, *Reconnect*, etc.

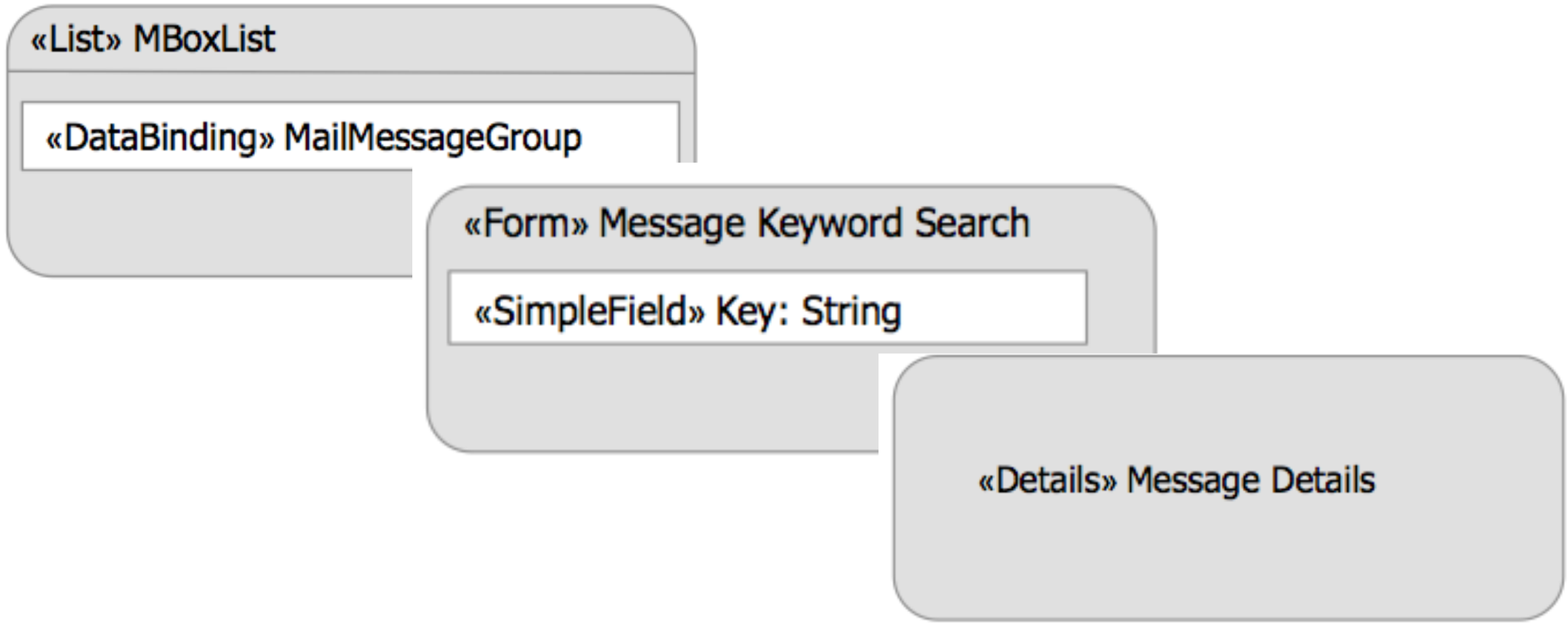
IFML by example



IFML – Subtyping Events

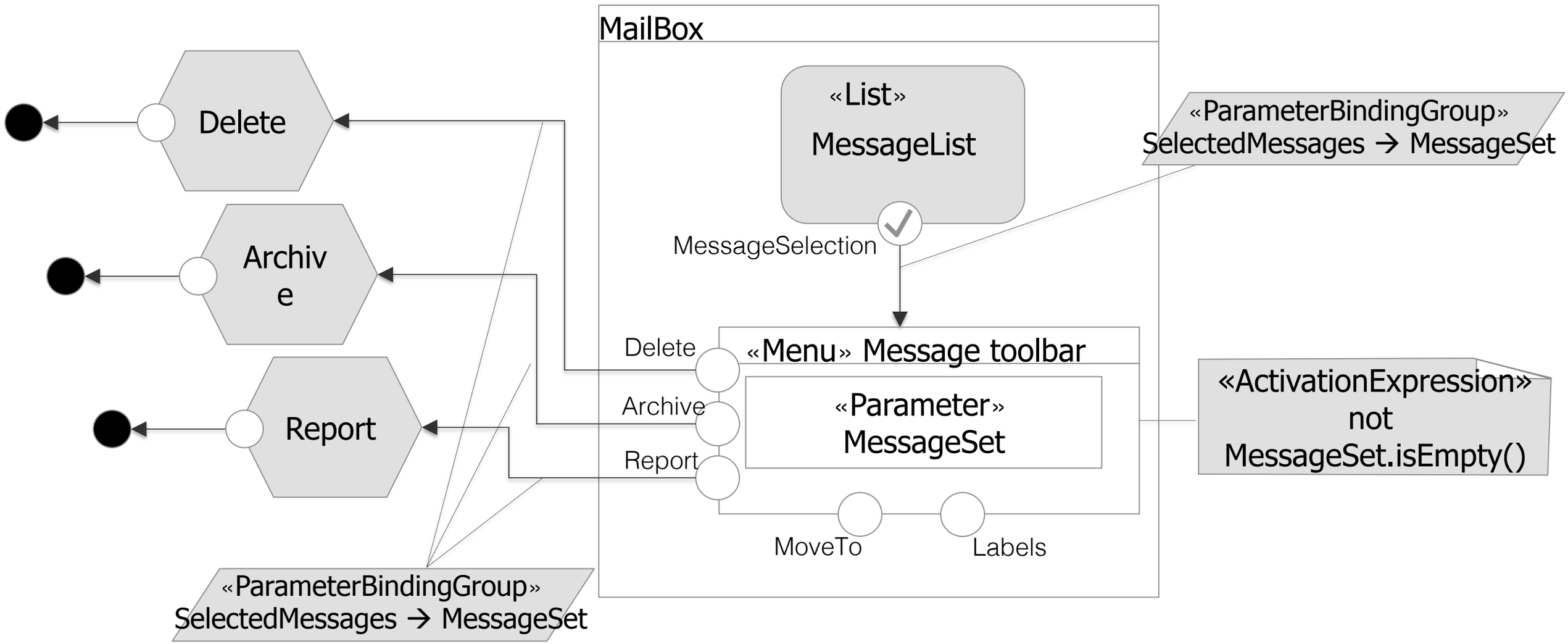


IFML – Subtyping Components



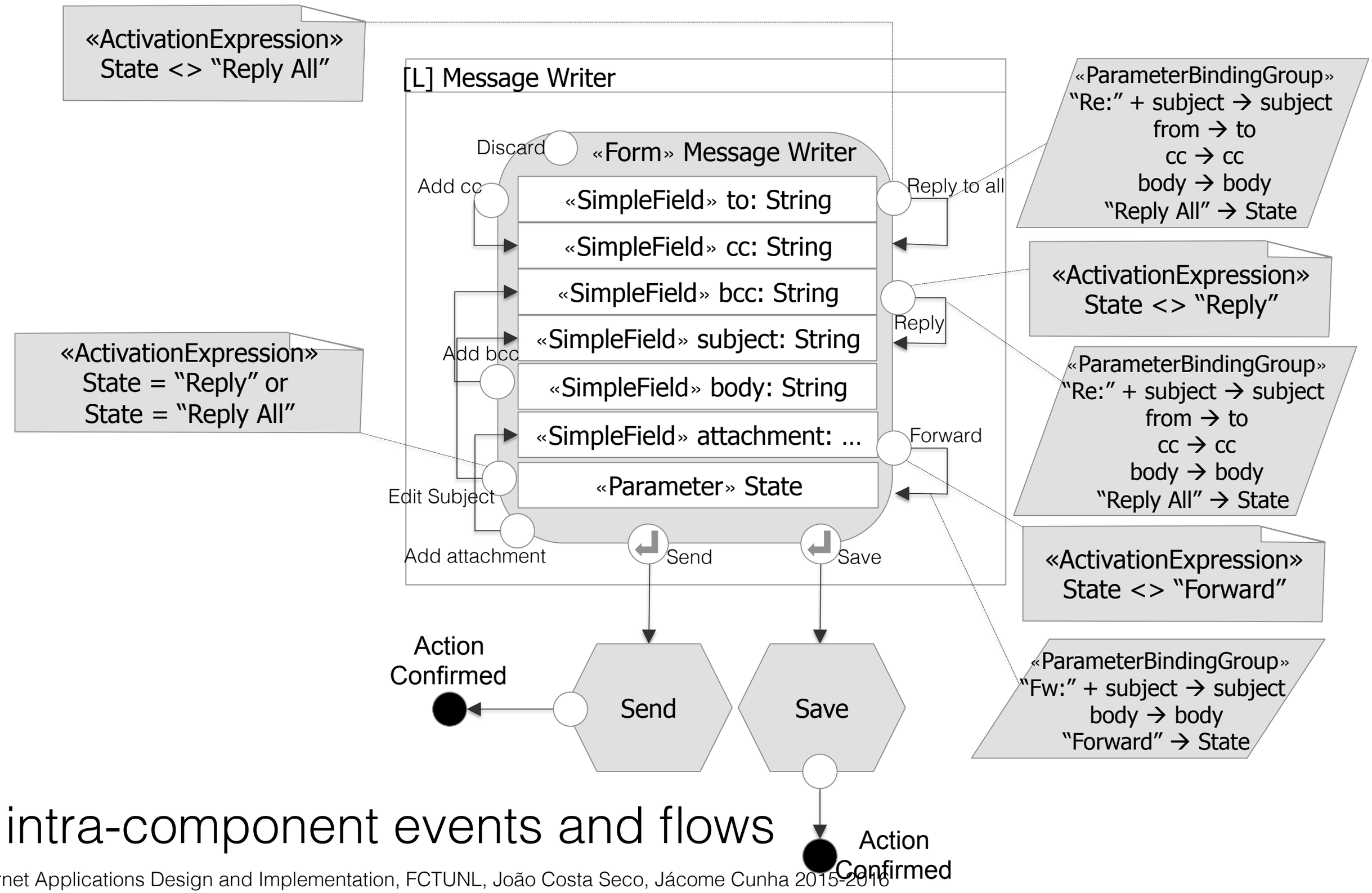
And as many others as you want!

IFML by example – mailbox



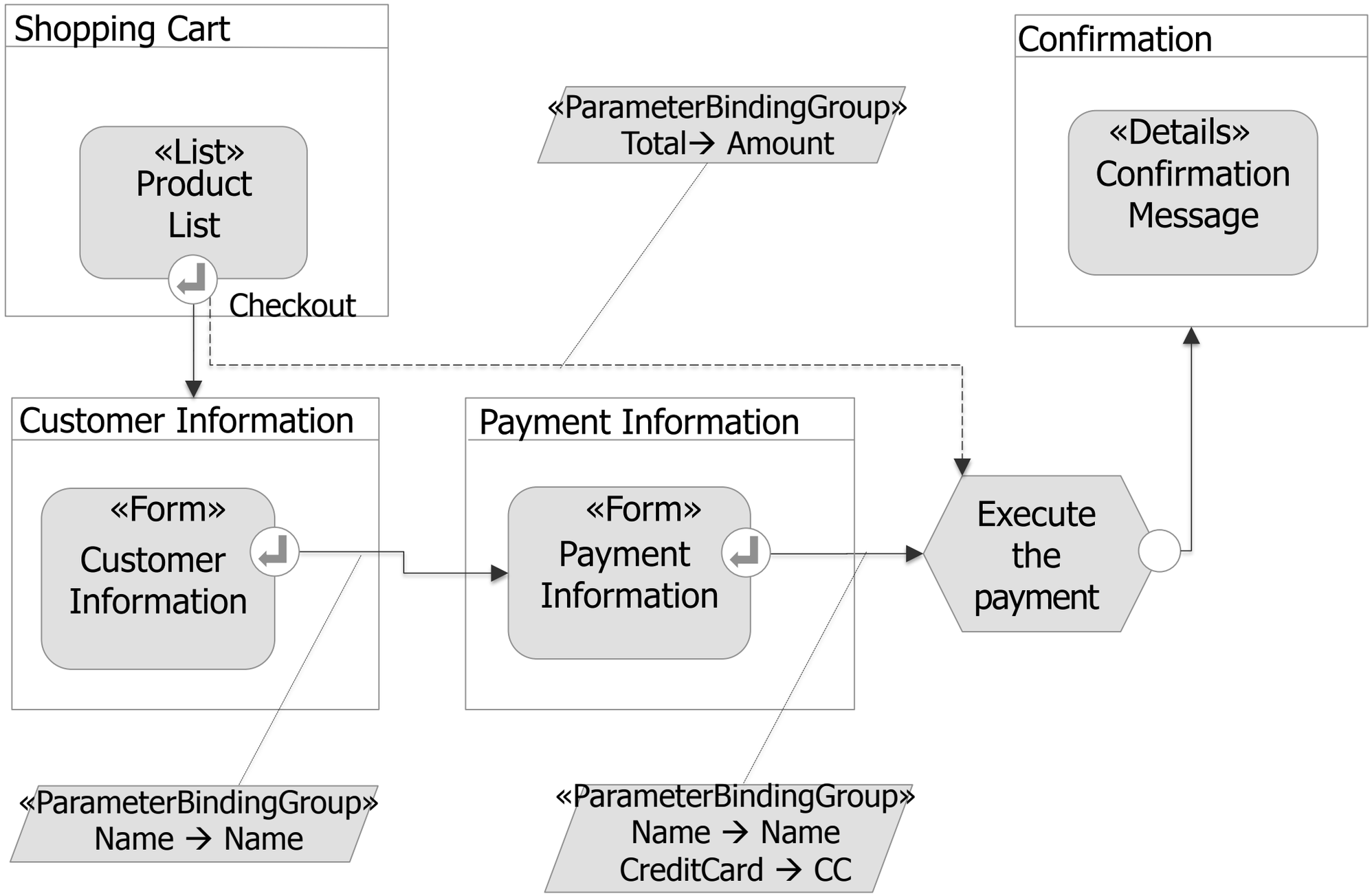
ActivationExpression, SubmitEvent, Event generation

IFML by example – email

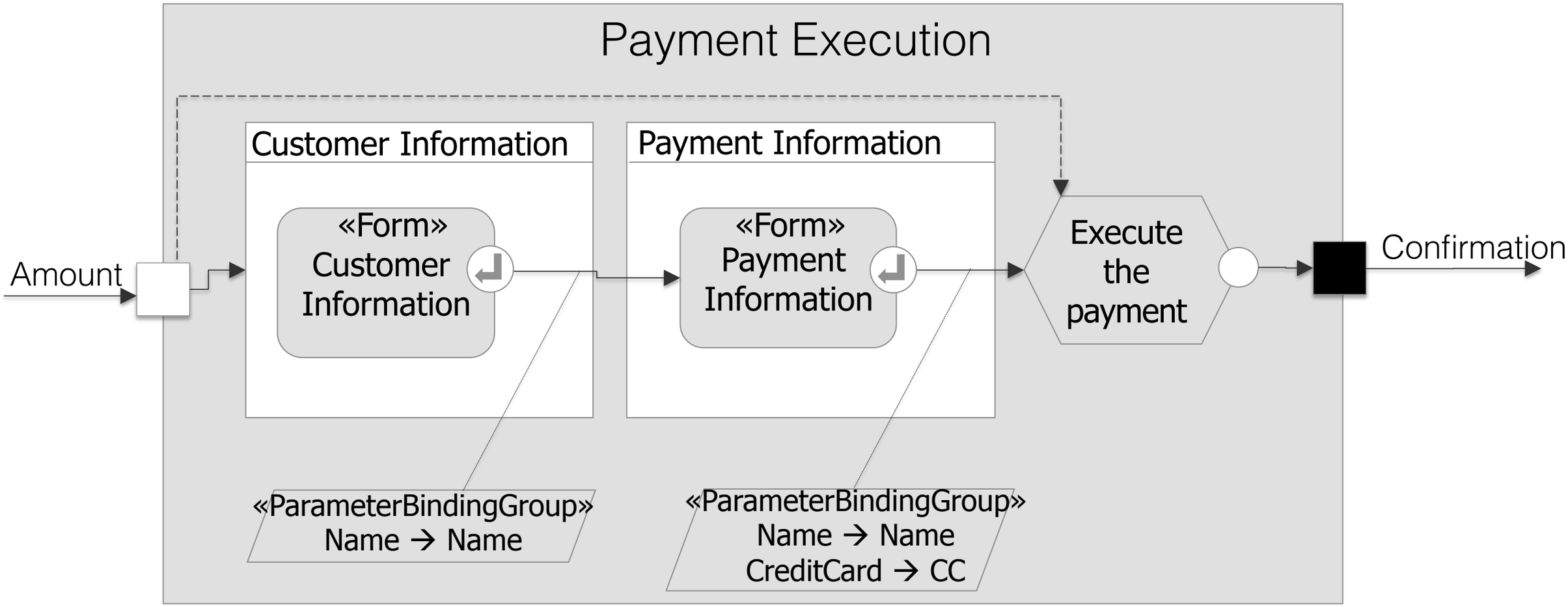


intra-component events and flows

IFML example – online payment



IFML – Modules



IFML – (Re)using Modules