Methods for the specification and verification of business processes
MPB (6 cfu, 295AA)

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http://www.di.unipi.it/~bruni
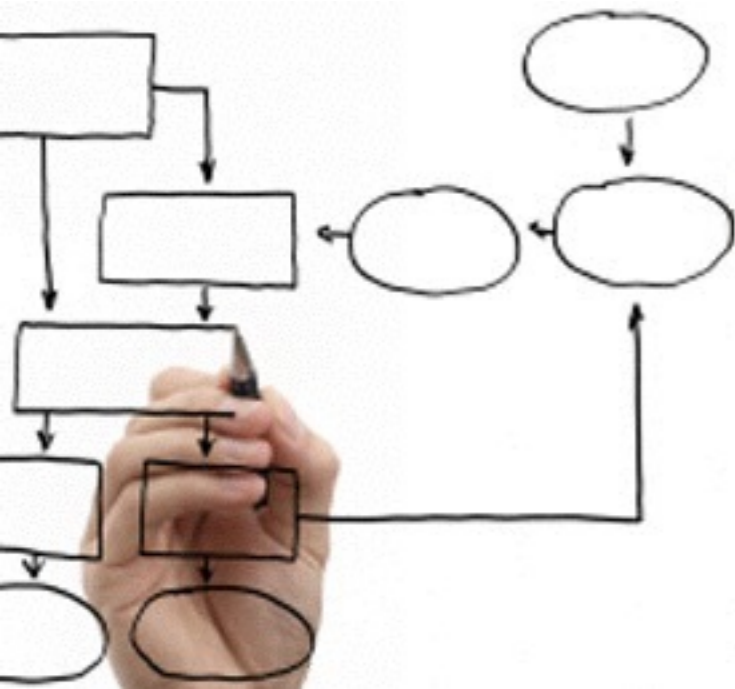
02 - Examples

Insurance claim example
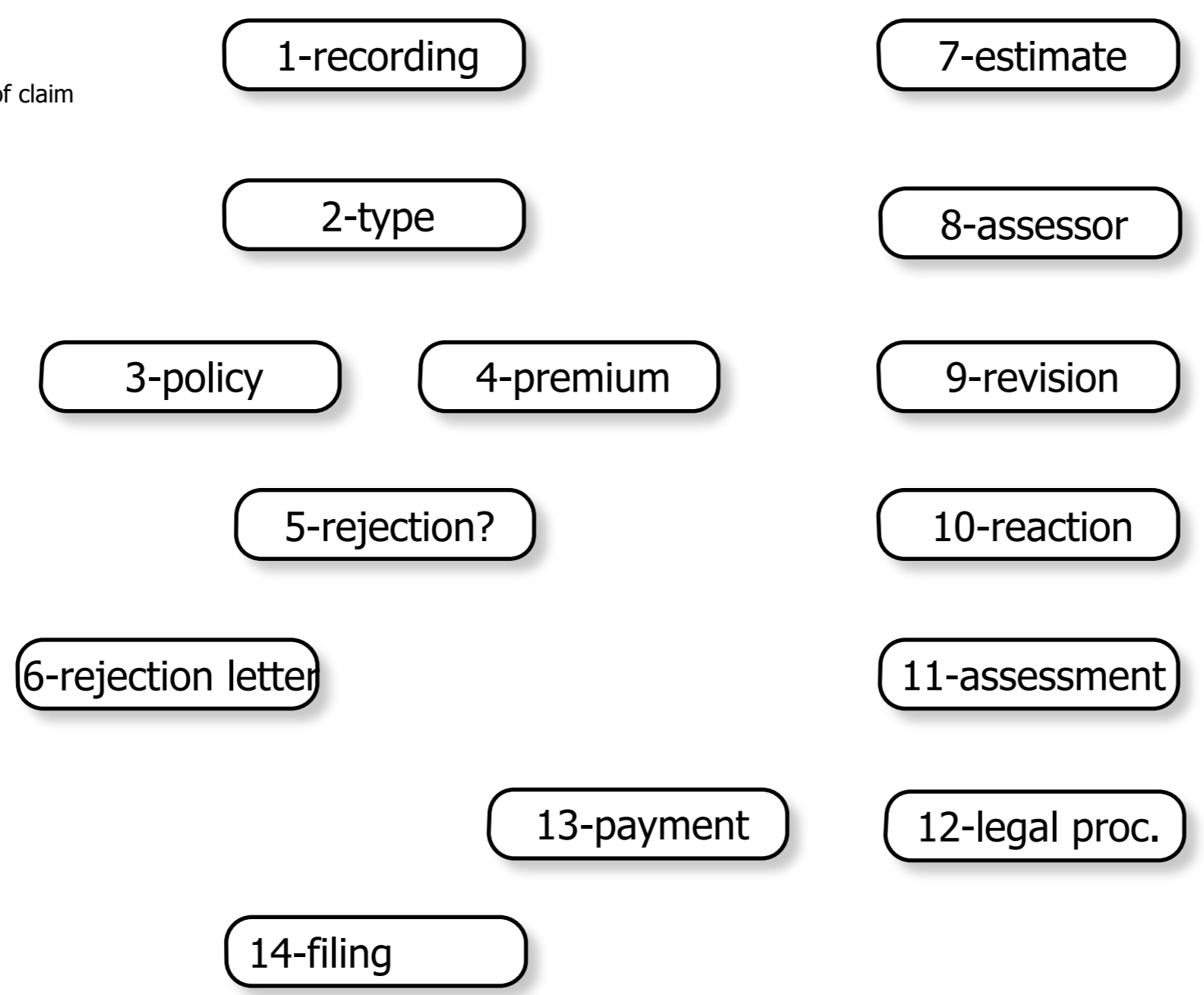
Sect.1.3 of Workflow Management: Models, Methods, and Systems

An example: insurance claim
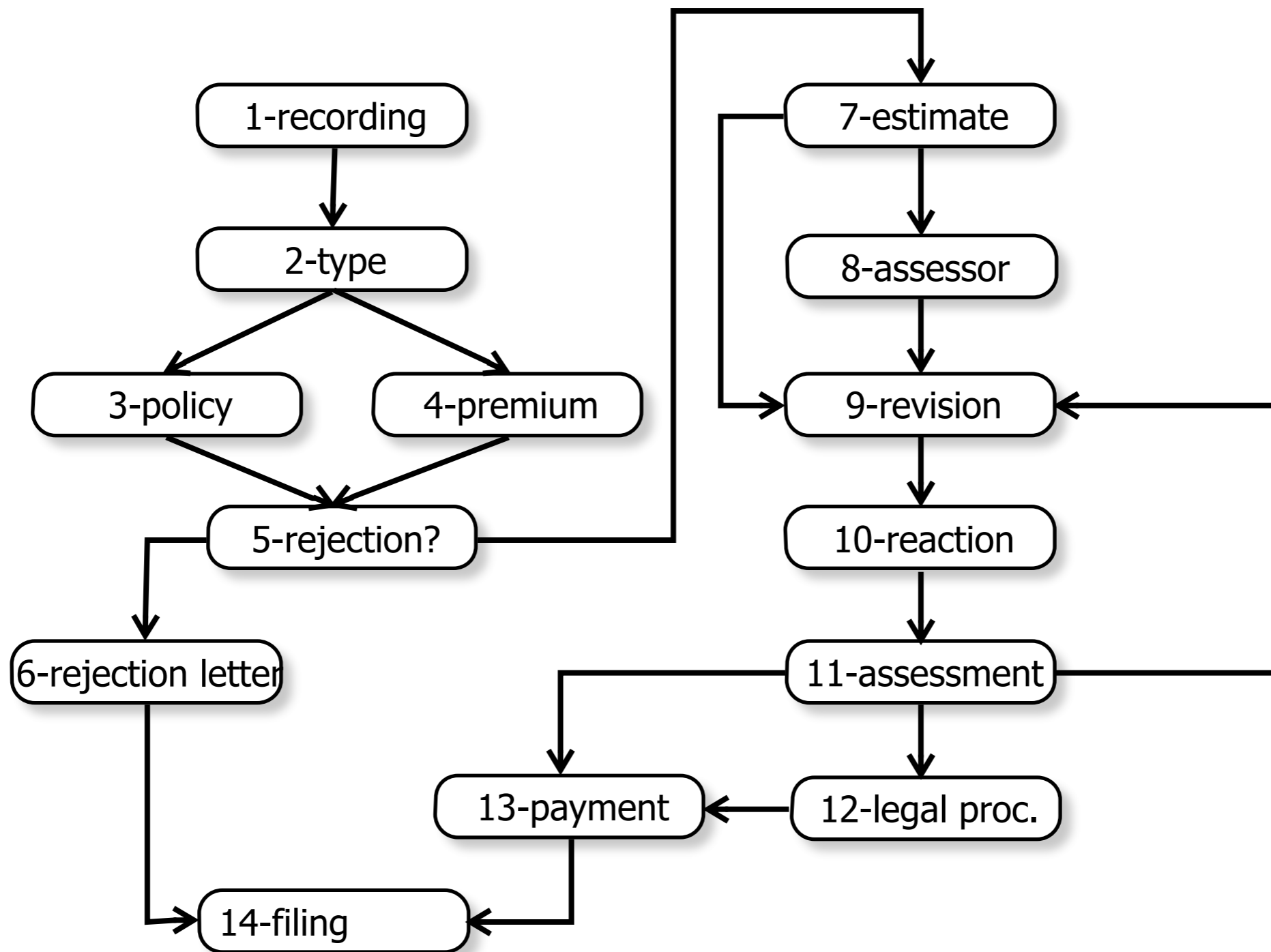
1. recording the receipt of the claim
2. establishing the type of the claim
3. checking covering of client's policy
4. checking the premium (payments up to date?)
5. rejection, if 3 or 4 has negative result
6. producing a rejection letter
7. roughly estimate the amount to be paid, if 3 & 4 have positive results
8. appointment of an assessor, if needed
9. revision of the amount offered to the client
10. recording client's reaction
11. assessment of objection: decision to revise 9 or take legal action 12
12. legal proceedings
13. payment of claim
14. filing and closure of claim

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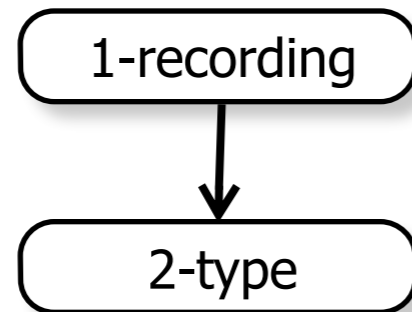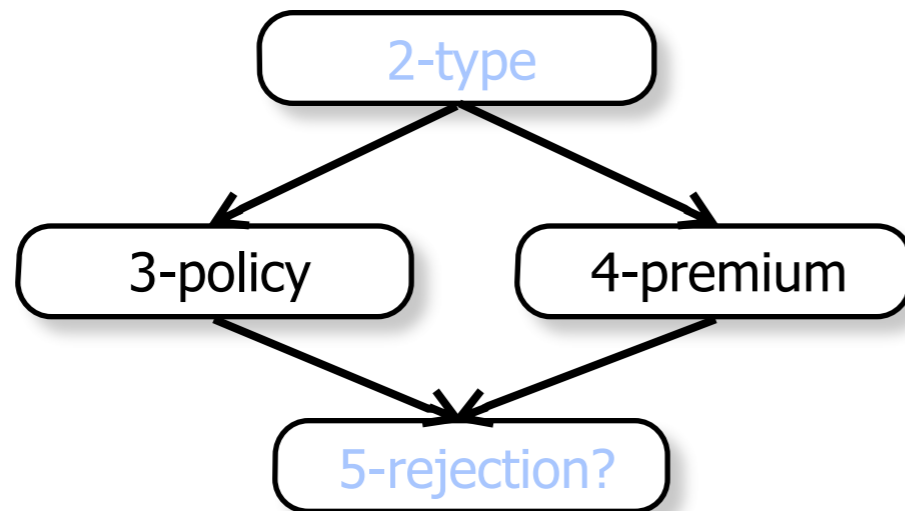13. payment of claim
14. filing and closure of claim

Tasks

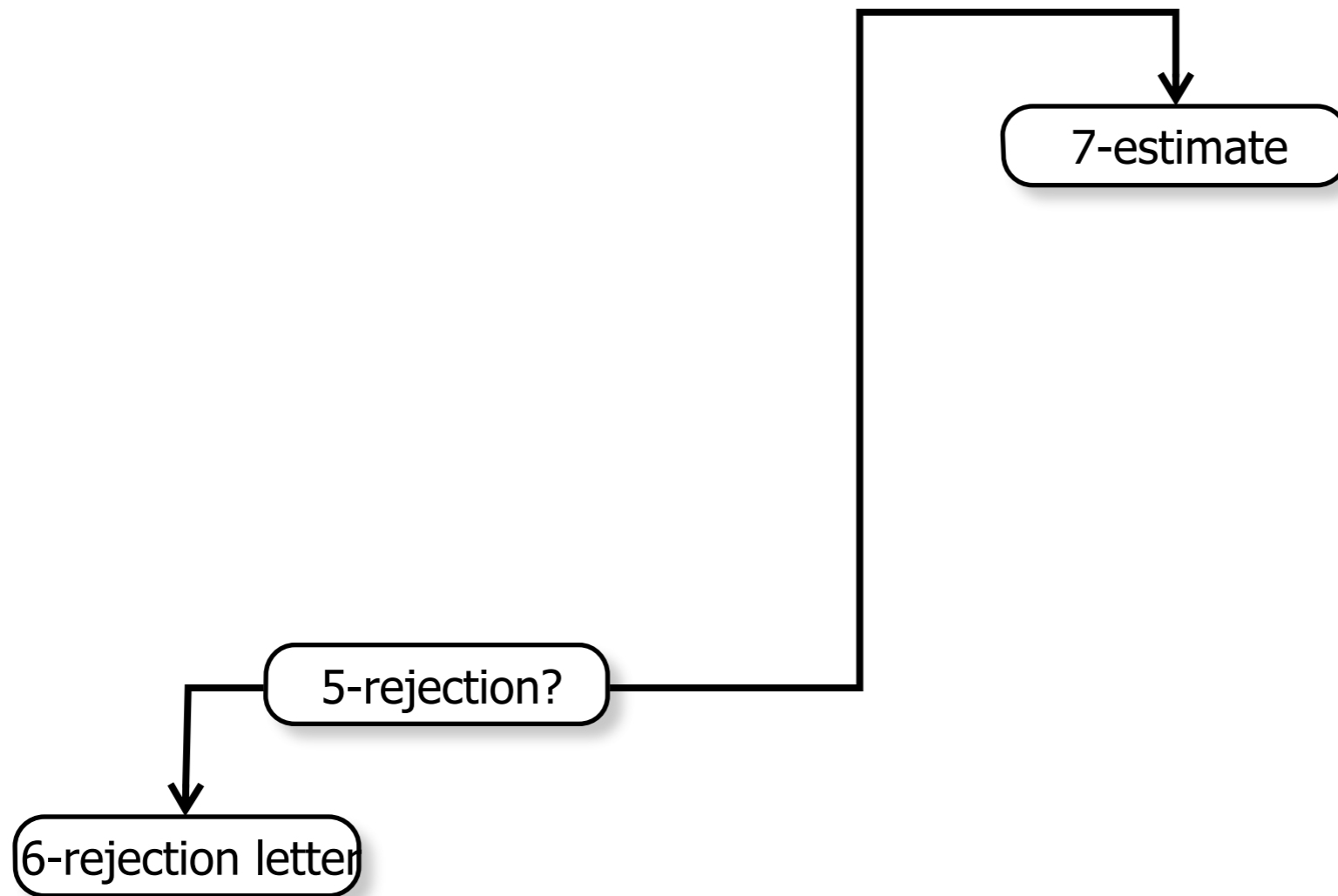|	
1-recording	7-estimate
2-type	8-assessor
3-policy 4-premium	9-revision
5-rejection?	10-reaction
6-rejection letter	11-assessment
13-payment	12-legal proc.
14-filing	

Order / links

Some link patterns

Sequence

```
┌─────────────┐
│ 1-recording │
└─────────────┘
       │
       ▼
┌─────────────┐
│   2-type    │
└─────────────┘
```

Parallel

Selection

7-estimate

5-rejection?

6-rejection letter

Another selection

Iteration

```
┌─────────────┐
│  9-revision │◄──────────┐
└─────────────┘           │
       │                  │
       ▼                  │
┌─────────────┐           │
│ 10-reaction │           │
└─────────────┘           │
       │                  │
       ▼                  │
┌───────────────┐         │
│ 11-assessment │─────────┘
└───────────────┘
       │
       ▼
┌───────────────┐
│ 12-legal proc.│
└───────────────┘
```

Ambiguity!

7-estimate

Both tasks 3 and 4 are always executed

2-type

3-policy   4-premium

5-rejection?

6-rejection letter

Task 6 and 7 are possibly executed but not both

Disambiguation

2-type

3-policy   4-premium

5-...ion?

6-rejection letter

7-estimate

+   parallel split

X   choice split

Ambiguity!

3-policy   4-premium

Both tasks 3 and 4 must be completed before task 5

5-rejection?

6-rejection letter

Task 6 and 13 are possibly executed but not both

13-payment

14-filing

Disambiguation

3-policy   4-premium

+

5-rejection?

6-rejection letter

13-payment

14-f... X

+ parallel split / join

X choice split / join

Orchestration

Business process models are performed in a single organization by definition

Thus, the **ordering of activitie**s can be controlled by a **business process management system** as a **centralized** software component
run by the organization
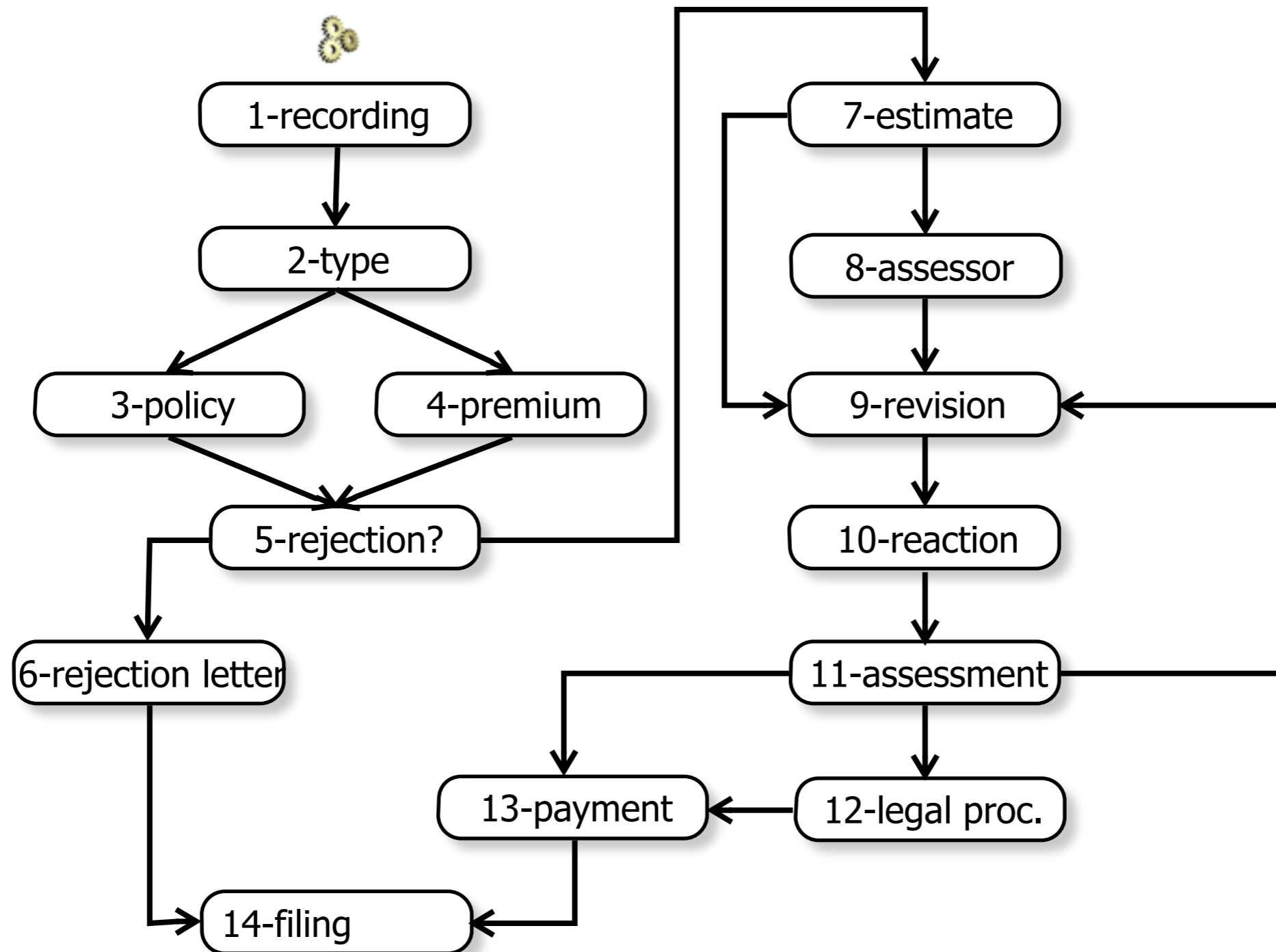
This kind of control is called **orchestration**

Orchestration

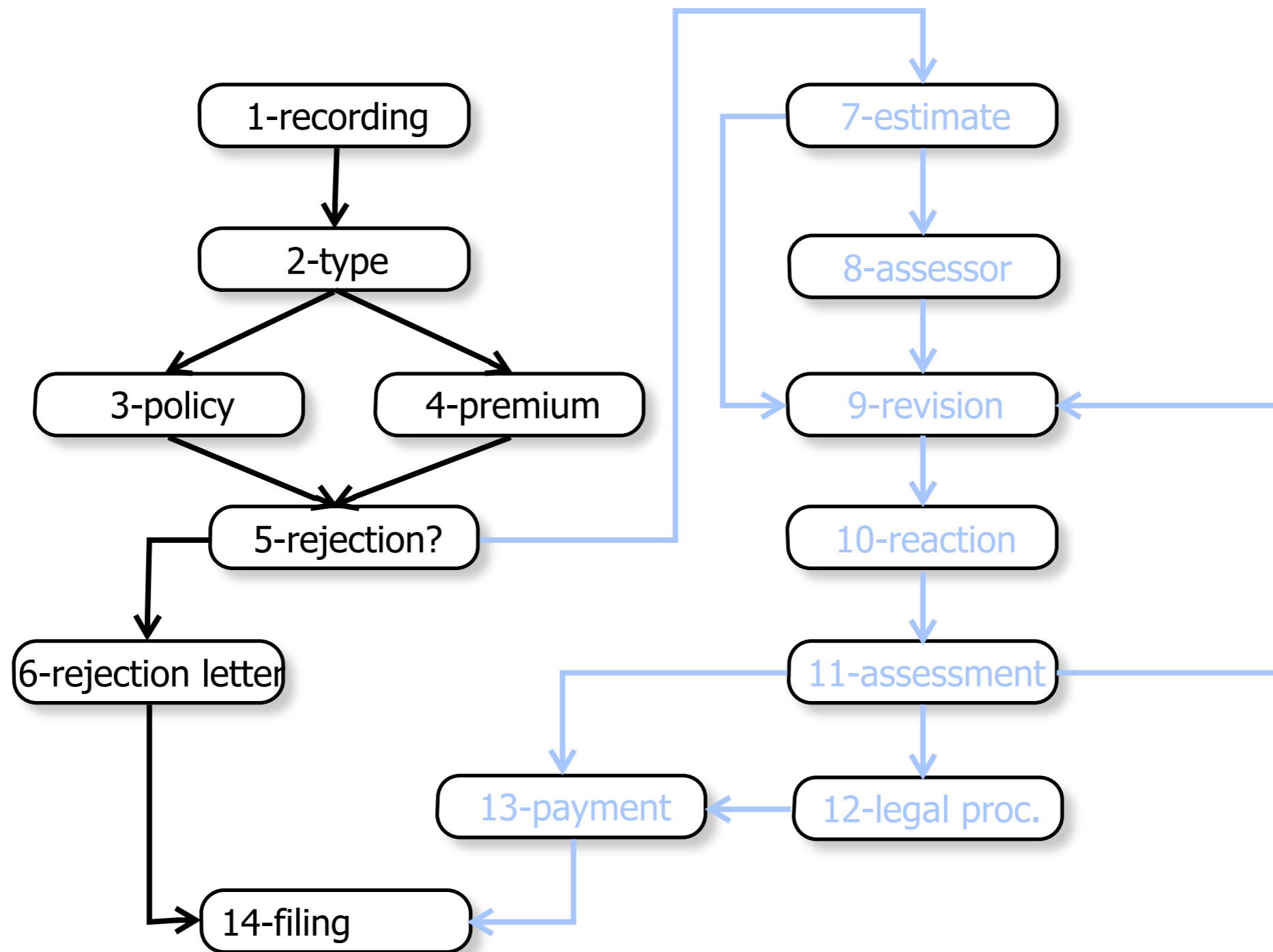Orchestration is about describing and executing a single view point model

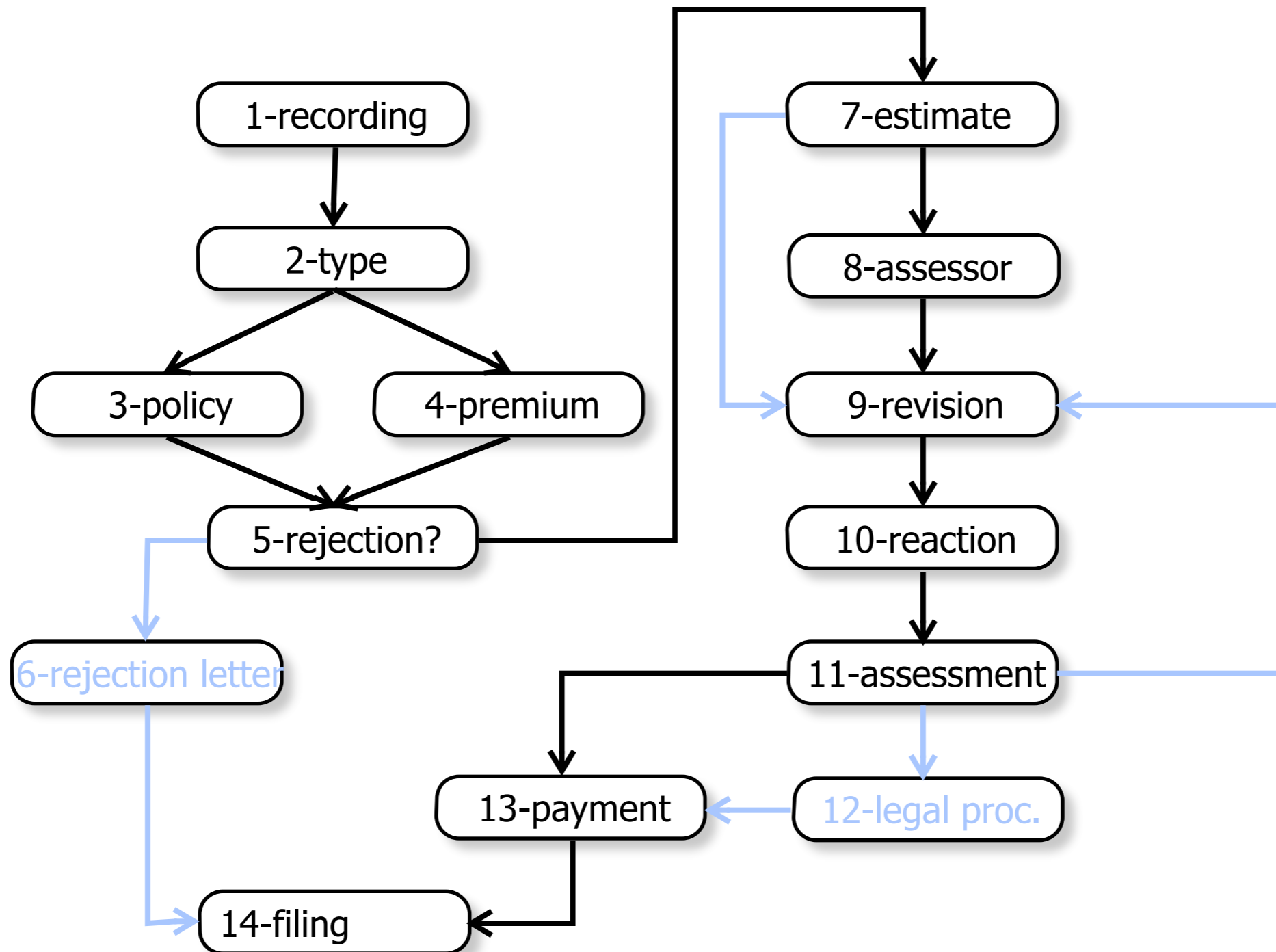The analogy is with the conductor who centrally controls the musicians in an orchestra
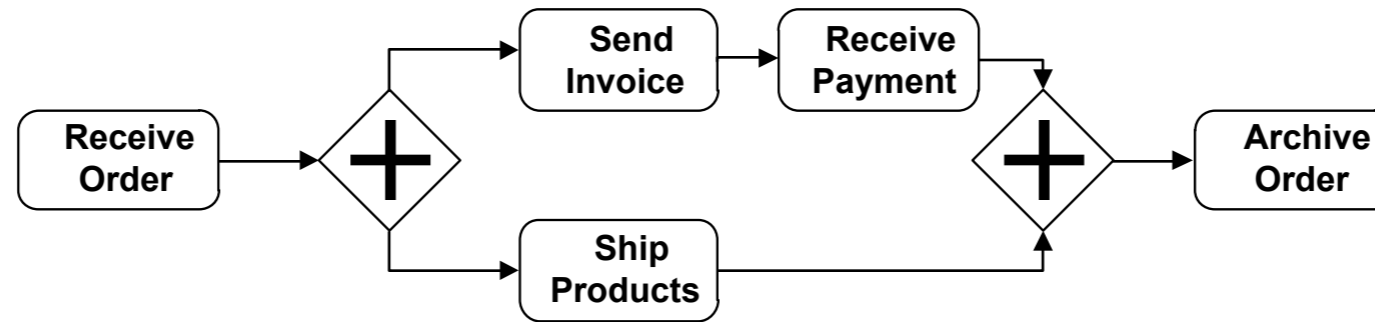
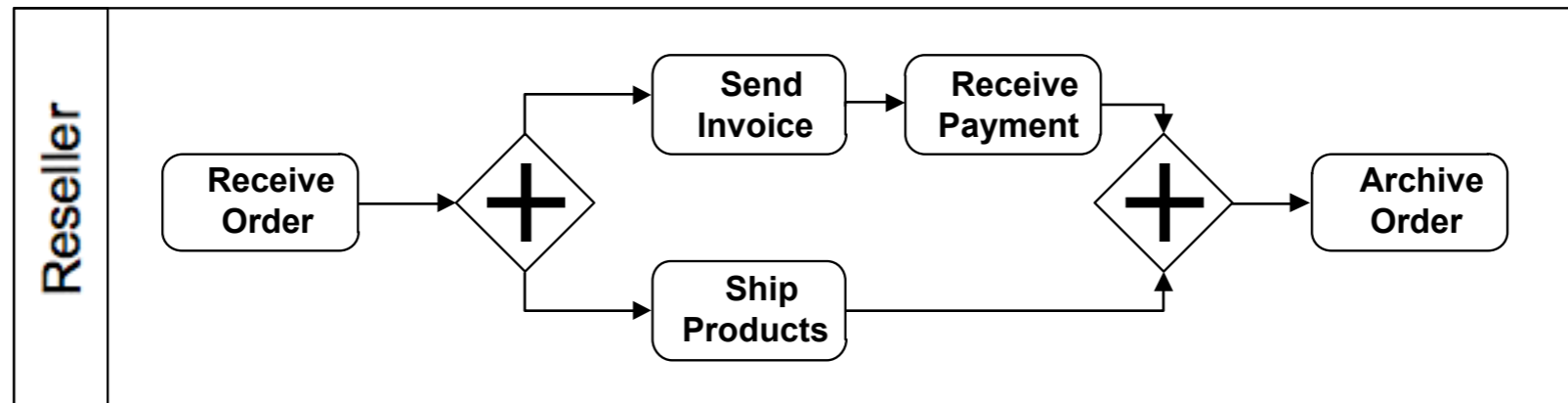# Executing the model

A process instance

Another instance

Buyer & Reseller example

Sect.1.1 of Business Process Management: Concepts, Languages, Architectures

Example: Reseller

Example: Reseller

Reseller

Receive Order → + → Send Invoice → Receive Payment → + → Archive Order
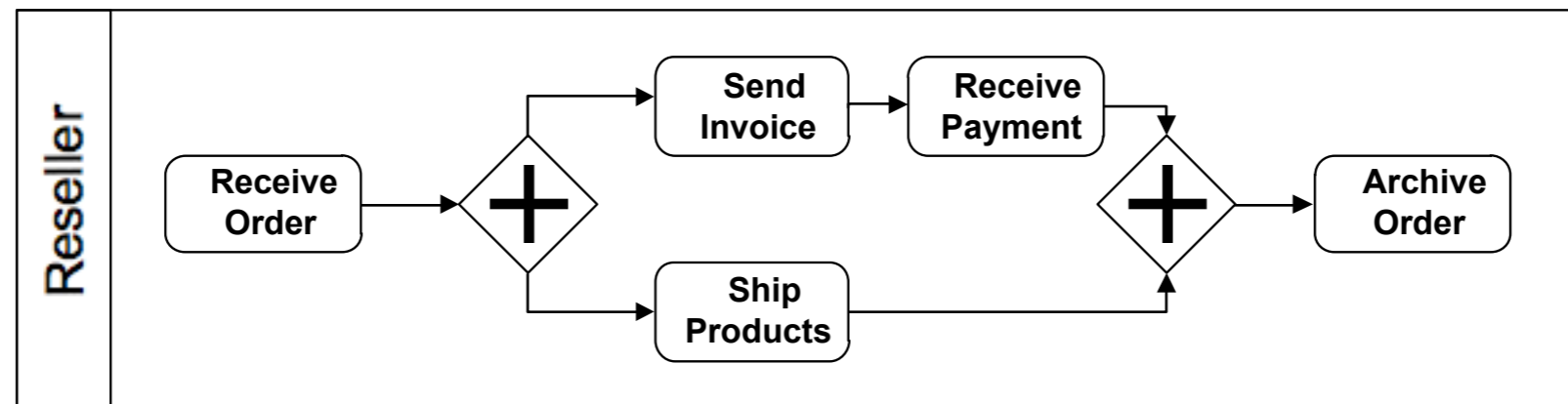
+ → Ship Products → +

We move to BPMN-like syntax

A **pool** is a rectangle
that encloses a business process

(it can be divided in **lanes**
to distribute tasks to different actors)
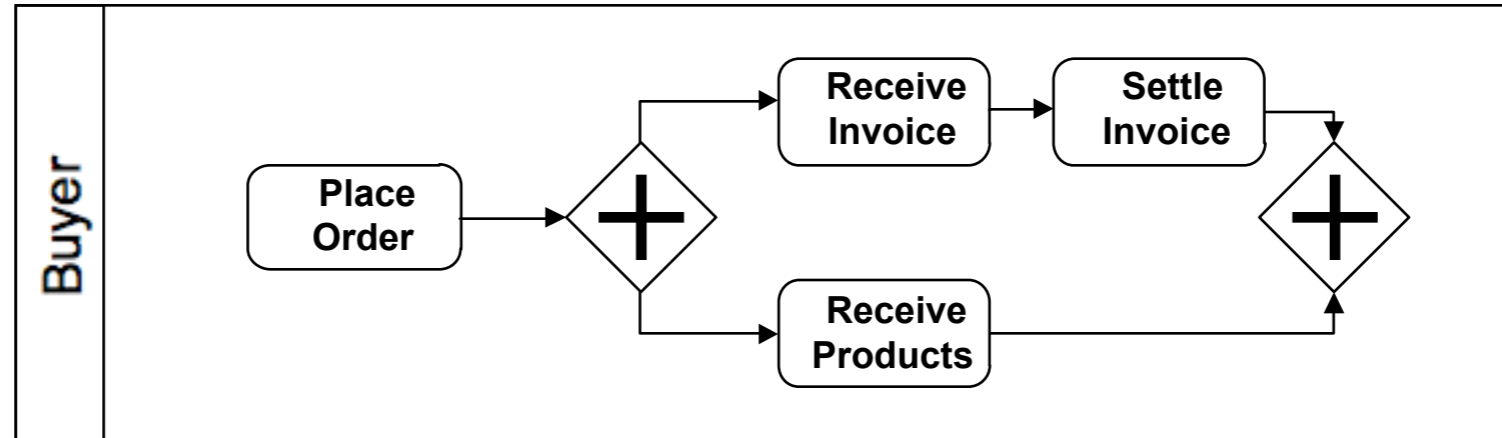
Example: Reseller

R_1

A reseller can use the business process model above to configure the business process management system accordingly

All instances will be executed as specified (after receiving the order, send and ship activites are concurrently executed)
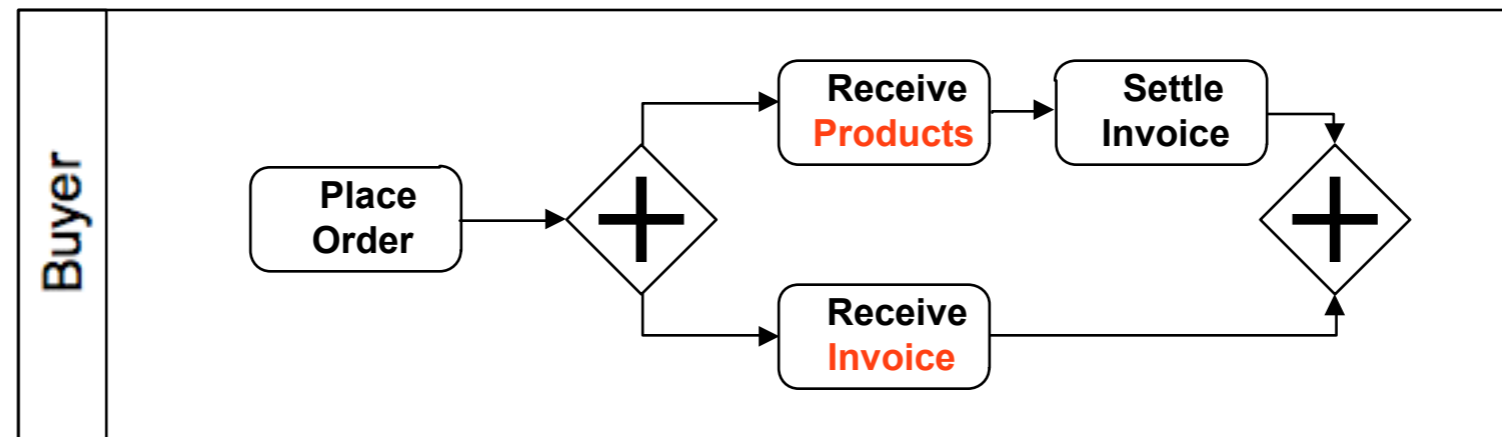
Example: Buyers
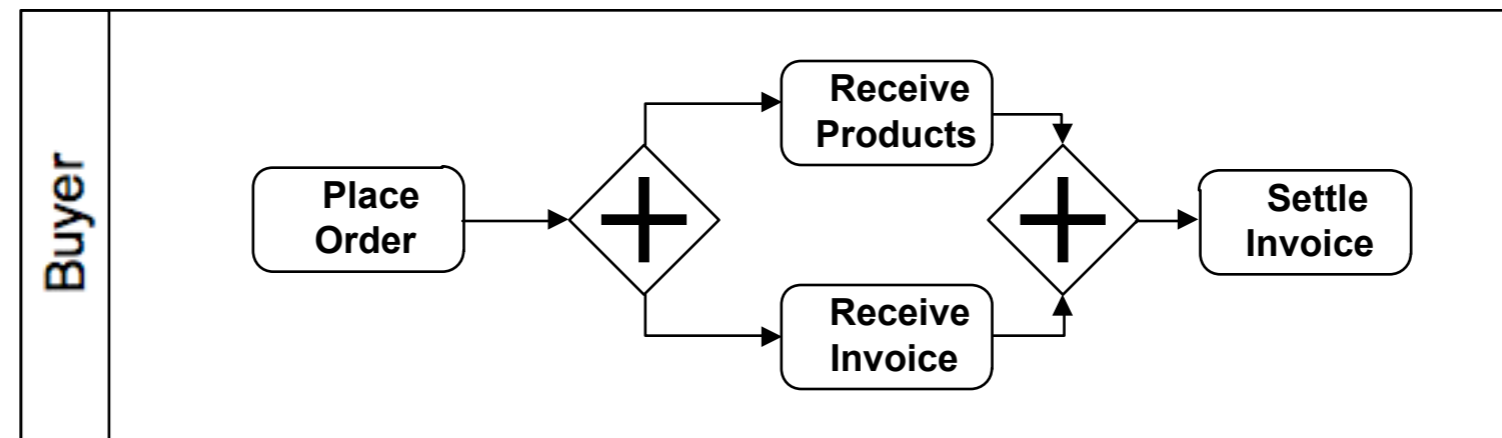
Different processes are possible.
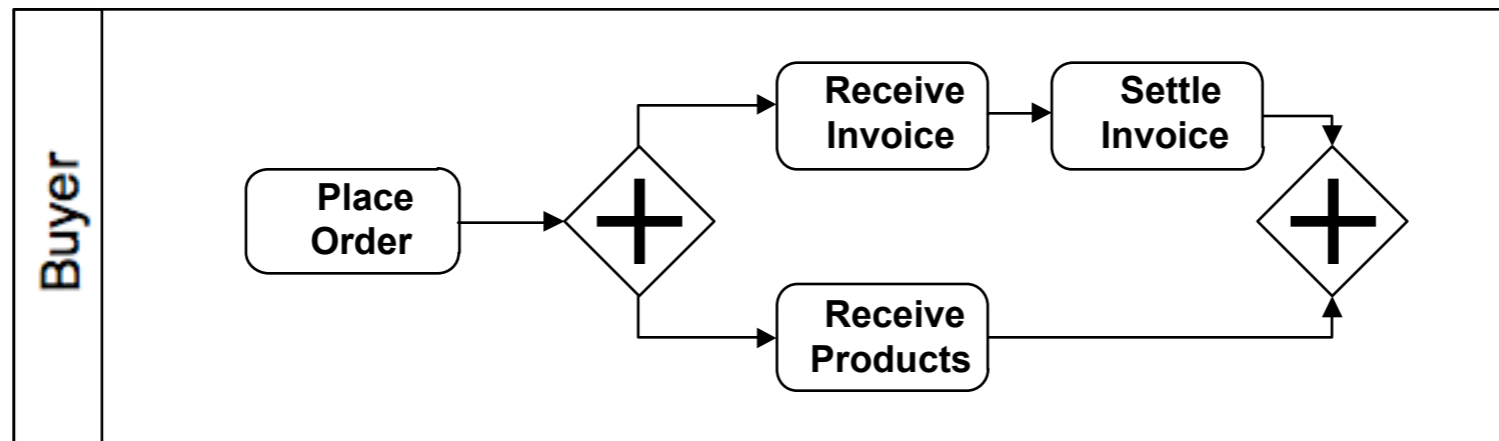
Do they all make sense?

B₁

B₂

B₃

Buyer & Reseller
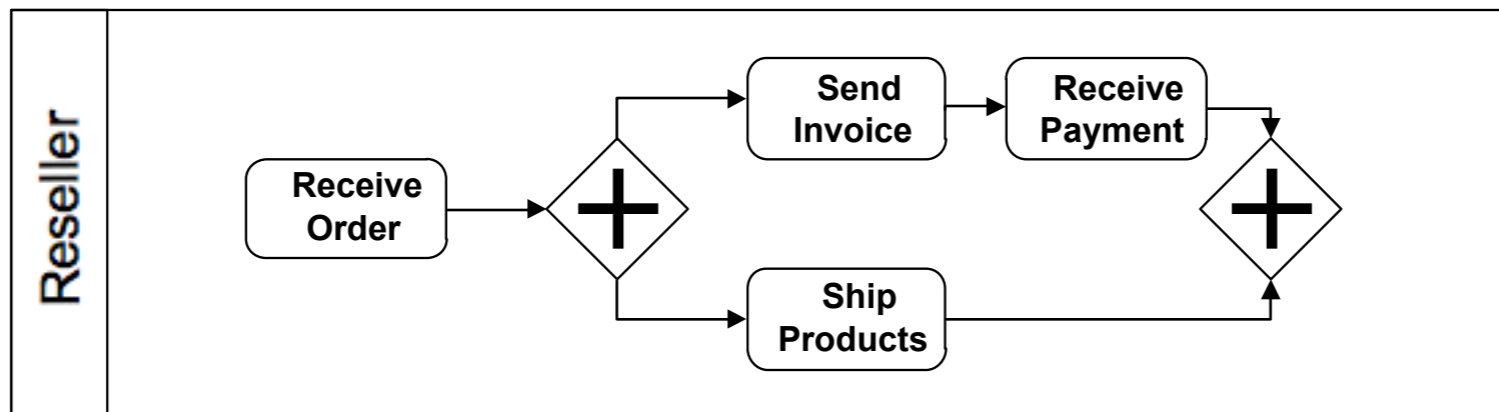

Separately developed processes need to communicate!

Cross-organization interaction

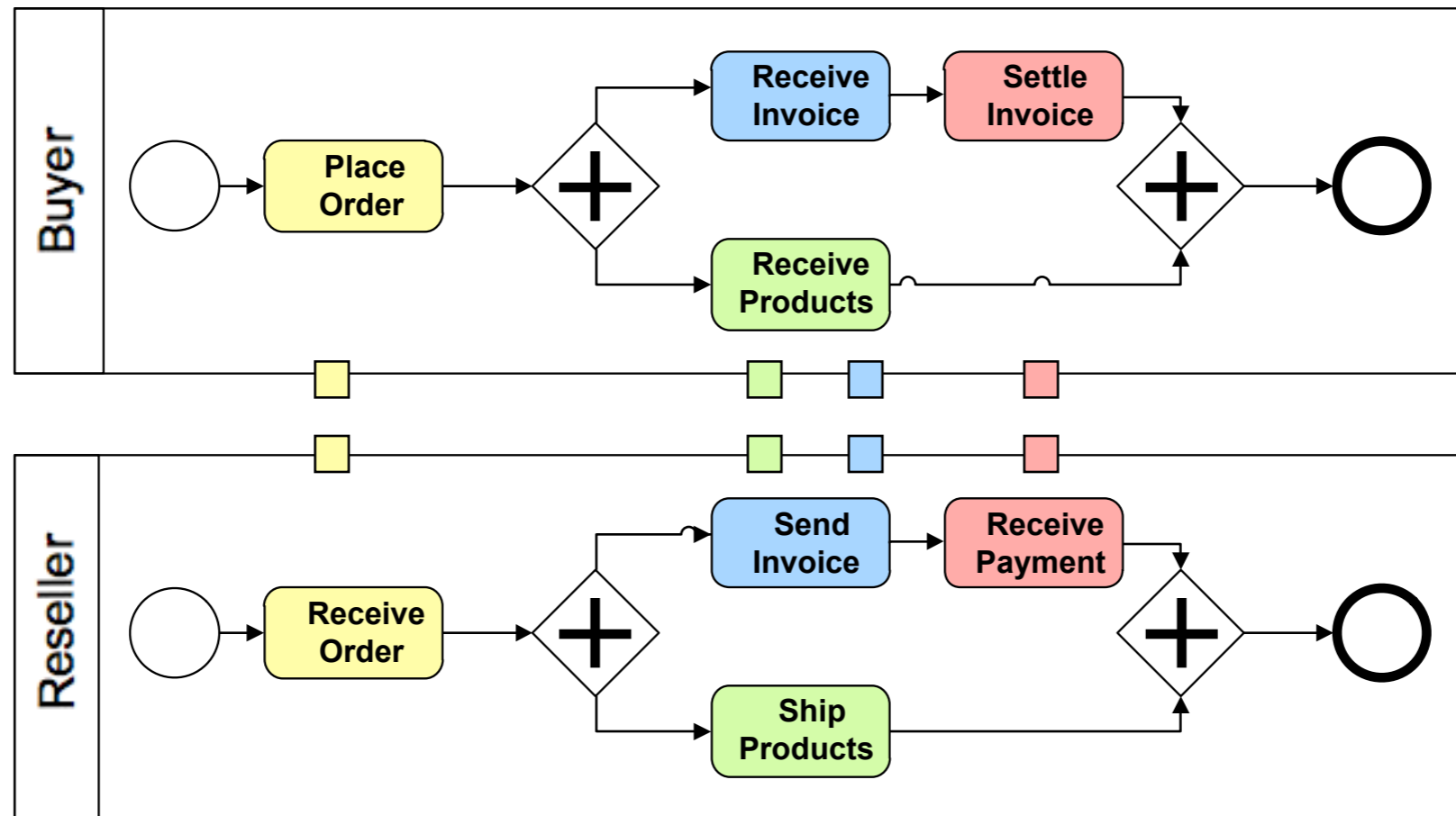Each business process is enacted by one organization

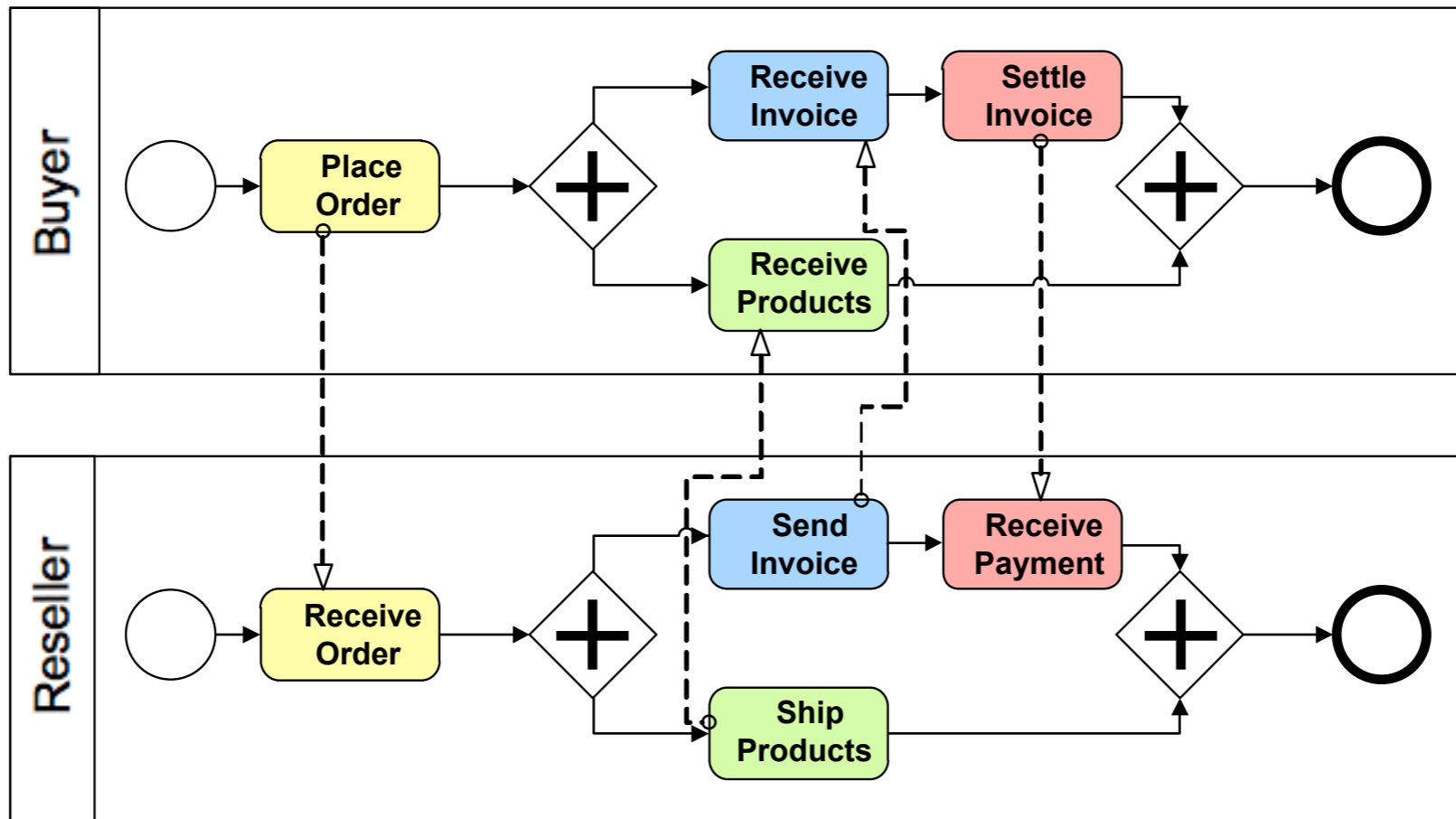Business processes can interact with each other

Interacting activities of business processes must be related together

Interacting processes

Interacting processes can exchange information
(electronic messages, physically transported objects)

Interacting processes

We move to BPMN-like syntax

Message flow is represented by dotted arcs

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Choreography

The interactions of a set of business processes are specified in a **process choreography**

Difference w.r.t. orchestration:
the absence of a central agent that controls the activities in the business processes involved

For the interaction to be realized correctly, the interacting business processes better **be aware** and **agree upon the choreography in advance**

Choreography

Choreography is about describing a global model (multi-point view)

The analogy is with the dancers who behave autonomously, but follow their parts in the choreography

Choreography diagram

Choreography diagrams allow for multiple concrete implementations, with different software support

Old-fashioned order: a buyer browses a paper catalogue of a reseller, then fills a postcard and sends it by snail mail and pay by bank transfer

e-commerce: a buyer browses an online web catalogue, fills a virtual basket and an electronic form (billing information) and presses the submit button. The goods themselves may be intangible (e-books, music, video, software)
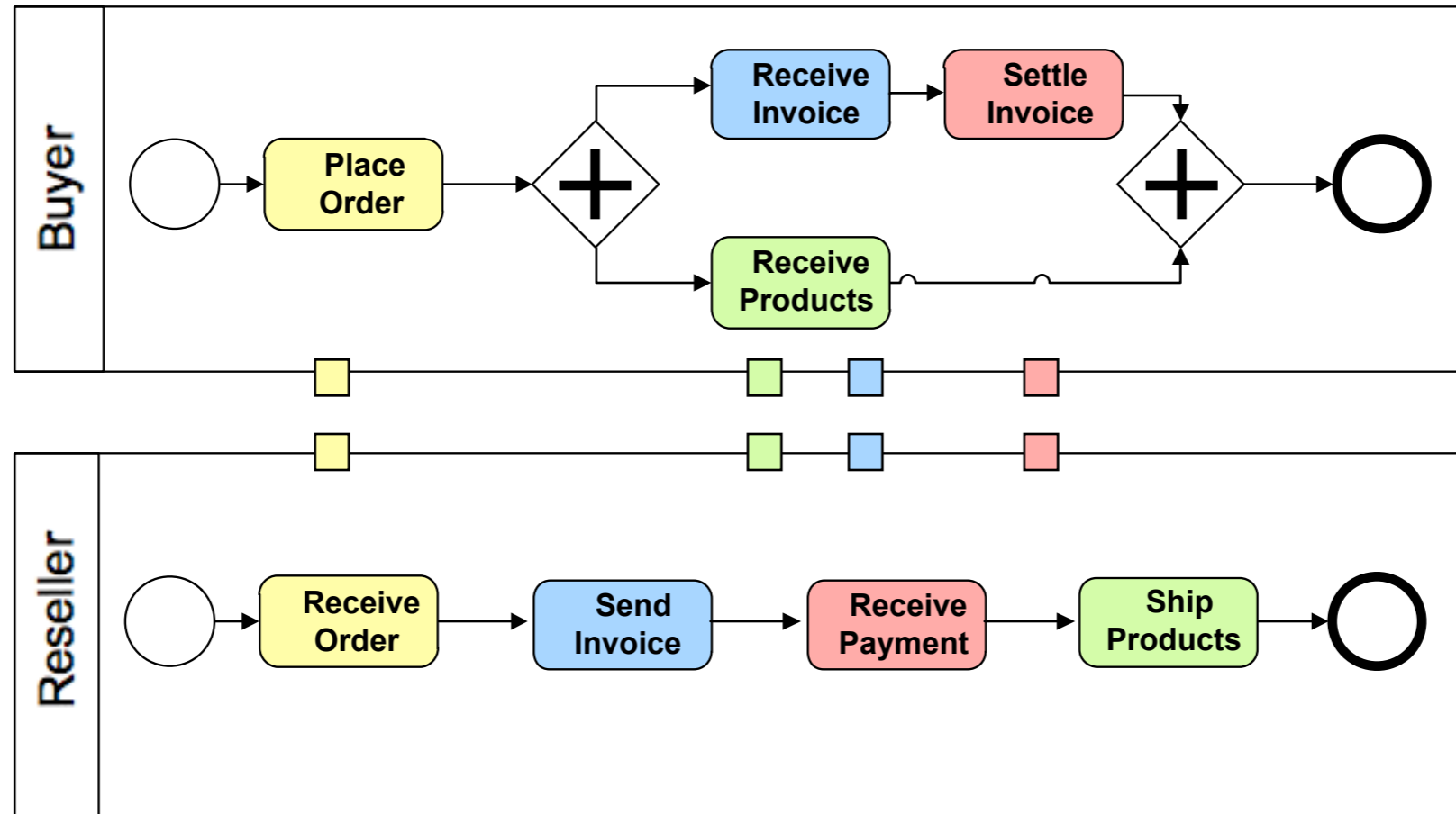
Interaction issues

As said, interacting business processes must be aware and agree upon the choreography

In such cases, **the realization of business processes by participants can change without affecting the overall behaviour**

On the other hand, **if the change is not done correctly, then some problems may arise**
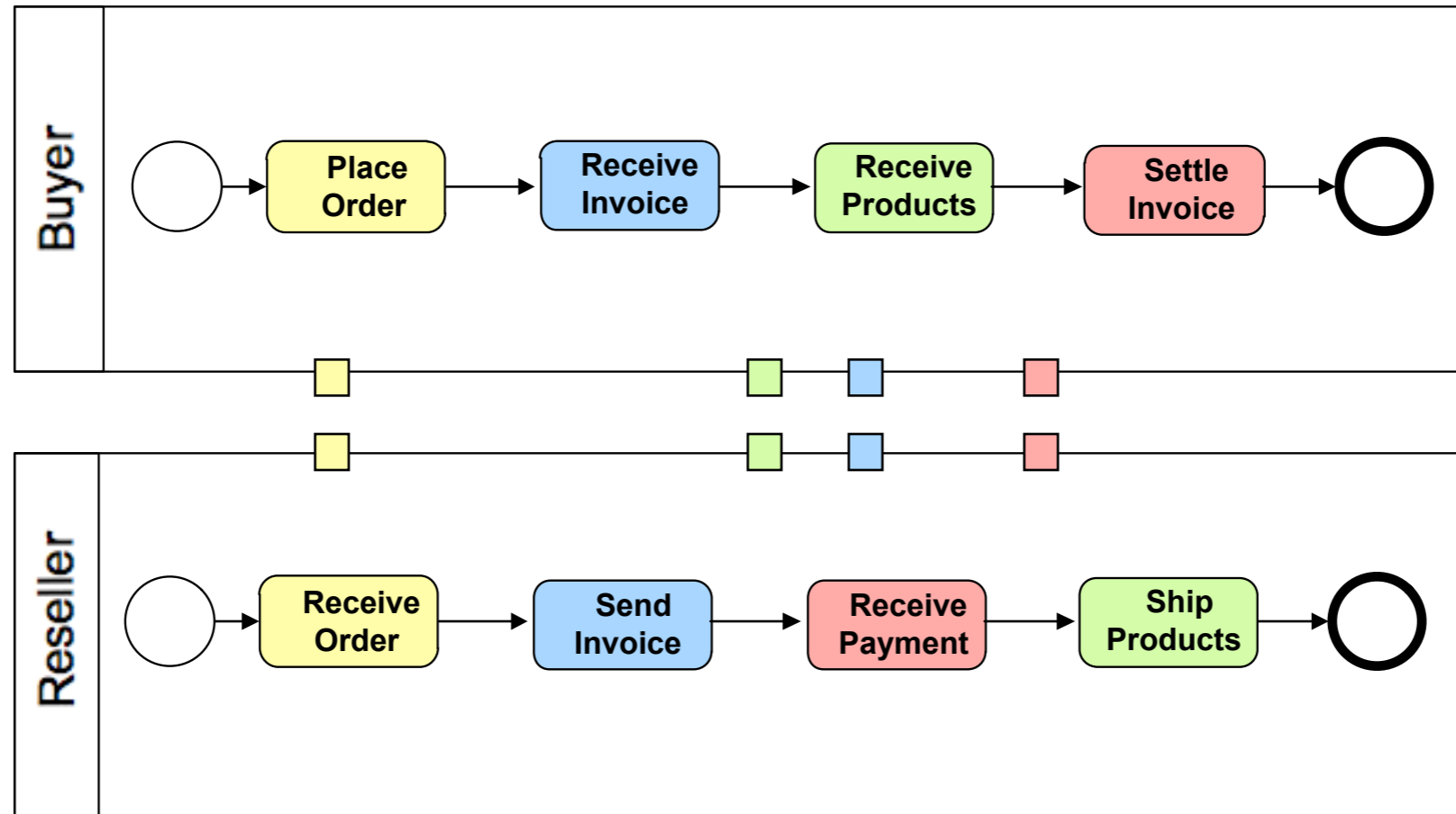
Question time

R$_2$

Still working fine?

Question time

B$_4$

Still working fine?

Exercises

In previous slides, we have seen many variants of business processes for resellers (two) and buyers (four).

Build a "compatibility" matrix with two rows and four columns and mark all the combinations for which some problems may arise during the interaction because activities are not implemented in the expected order.

You are also free to consider other process diagrams, by adding the corresponding rows and columns in the matrix.

	B_1	B_2	B_3	B_4
R_1	ok			
R_2	ok			no

Exercises

Travel agency: define a series of task for booking a flight, a hotel and optionally a car, with the possibility to change dates, to cancel the booking, to confirm the booking. Then, draw a process diagram relating the tasks.

Coffee break: draw the process diagram for a vending machine that accepts a coin, then gives the possibility (1) to get a coffee or (2) to insert another coin and get either a cappuccino or a tea. Draw the process diagrams for a compatible and a "problematic" butler robot.