Business Processes Modelling
MPB (6 cfu, 295AA)

Roberto Bruni
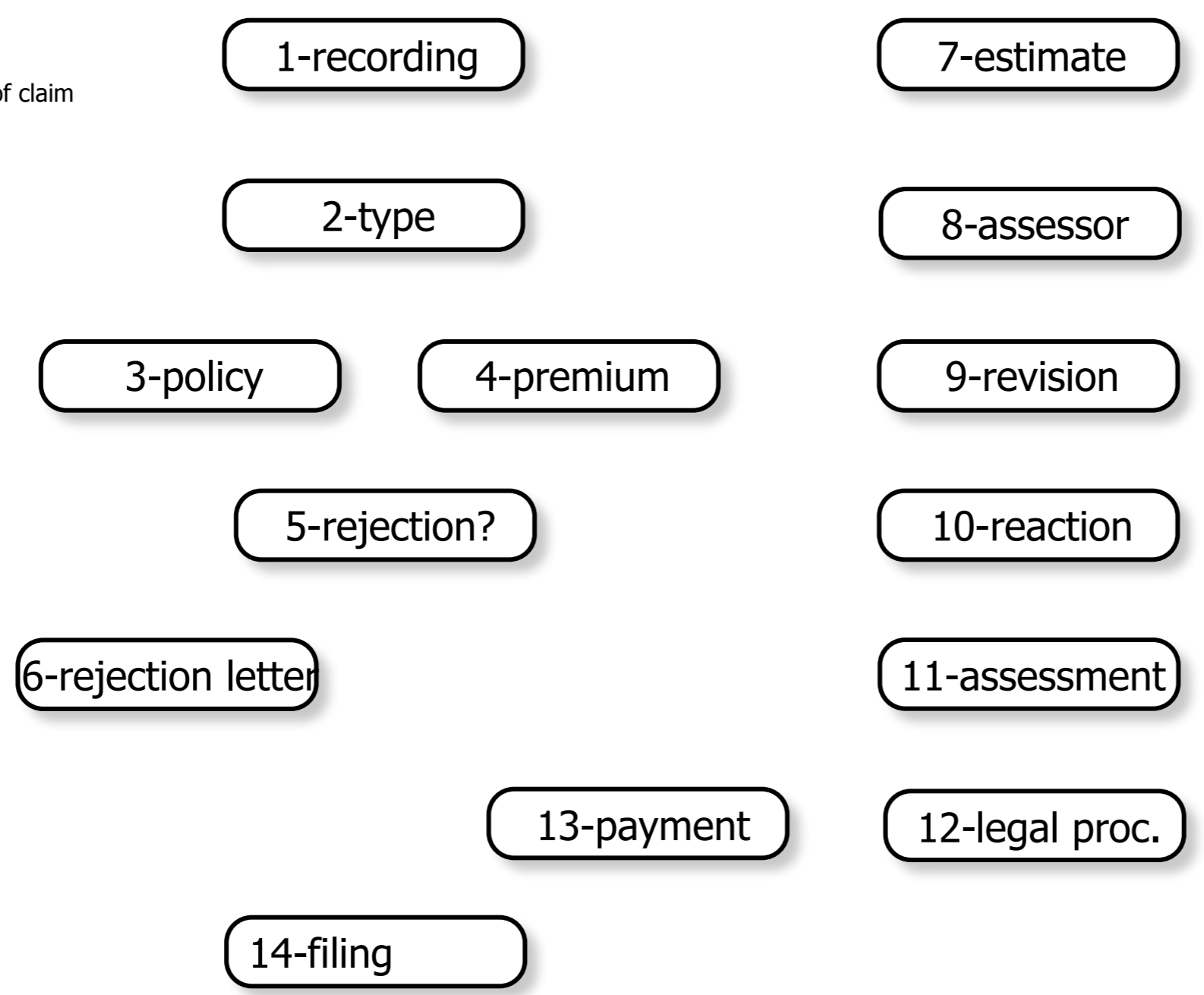http://www.di.unipi.it/~bruni

02 - Examples

Insurance claim example

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

An example: insurance claim
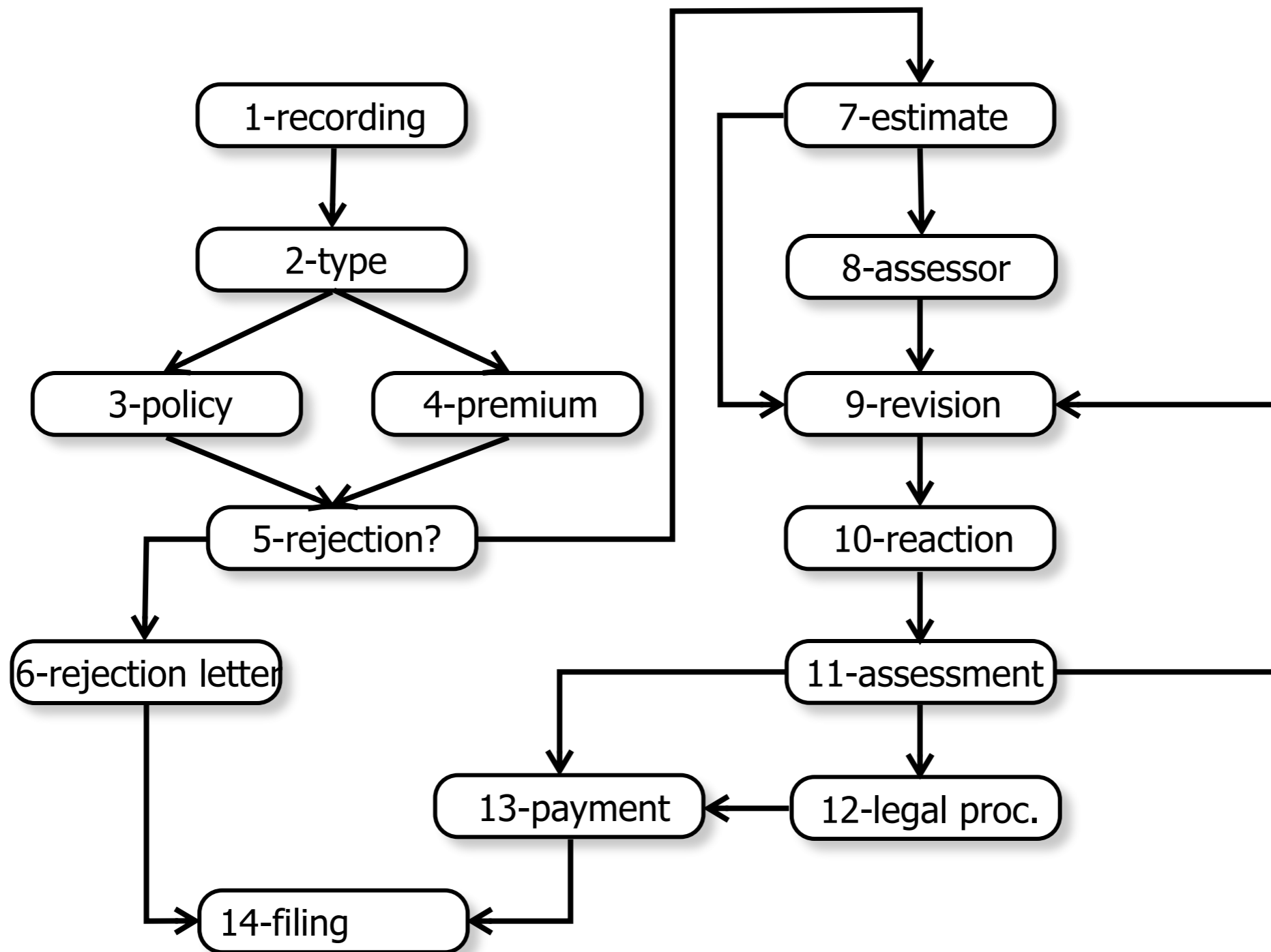
1. recording the receipt of the claim
2. establishing the type of the claim
3. checking covering of client's policy
4. checking the premium (payments up to date?)
5. rejection, if 3 or 4 has negative result
6. producing a rejection letter
7. roughly estimate the amount to be paid, if 3 & 4 have positive 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

Tasks

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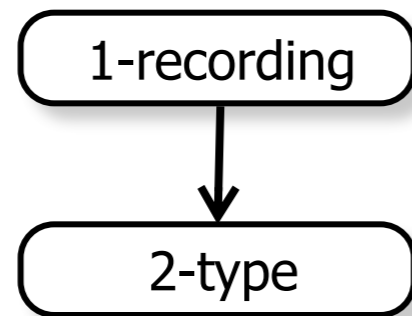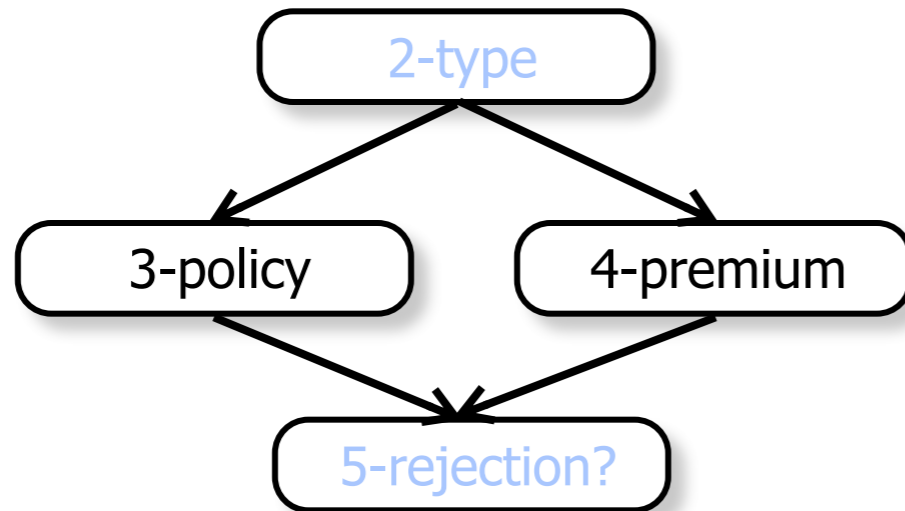13. payment of claim
14. filing and closure of claim

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
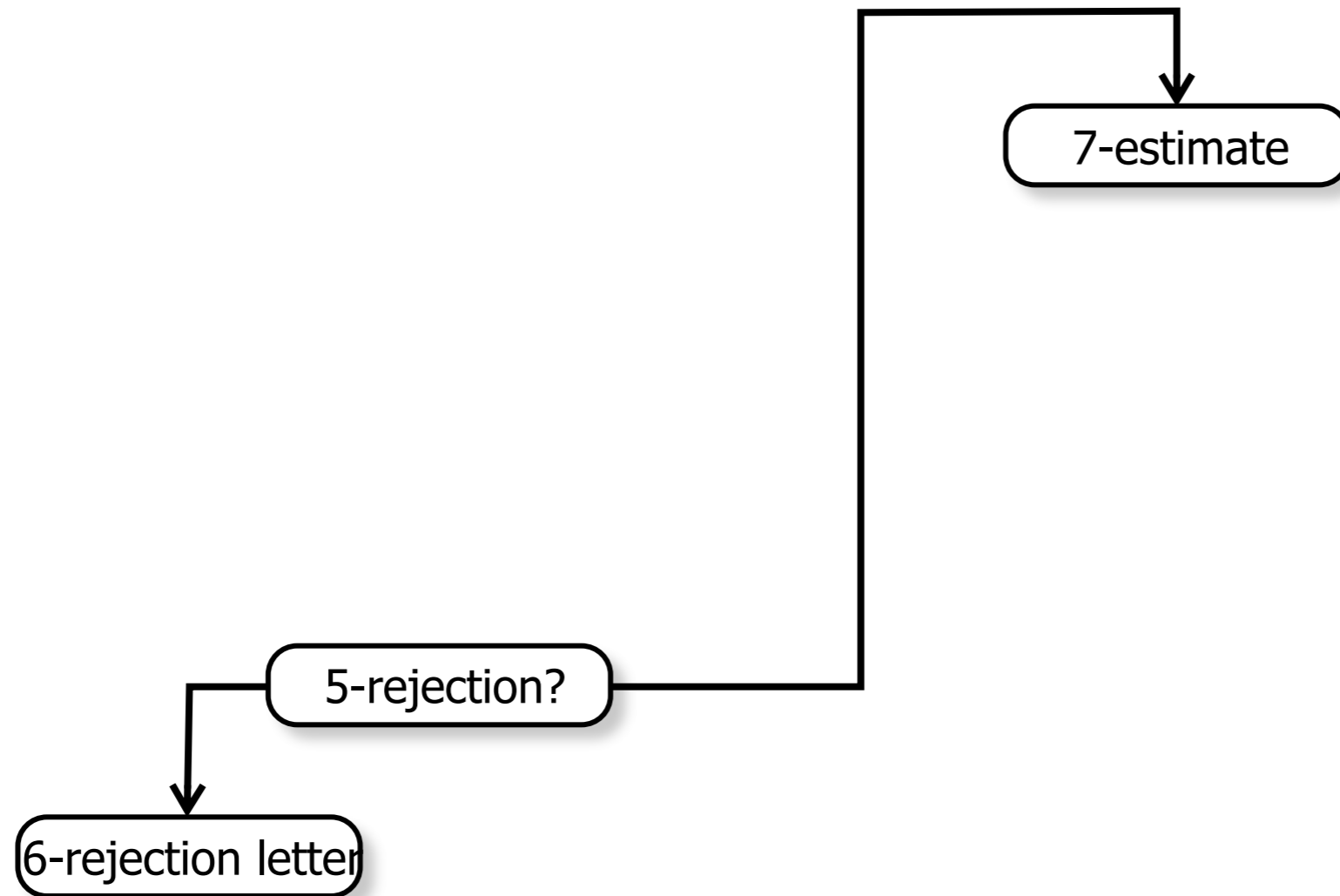
```
┌─────────────┐
│  7-estimate │──┐
└──────┬──────┘  │
       │         │
       ▼         │
┌─────────────┐  │
│  8-assessor │  │
└──────┬──────┘  │
       │         │
       ▼         │
┌─────────────┐  │
│  9-revision │◄─┘
└─────────────┘
```

Iteration

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

7-estimate

2-type
$+$

3-policy   4-premium

5-...ion?
$\times$

6-rejection letter

$+$ | parallel split

$\times$ | 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-fi X

+   parallel split / join

X   choice split / join
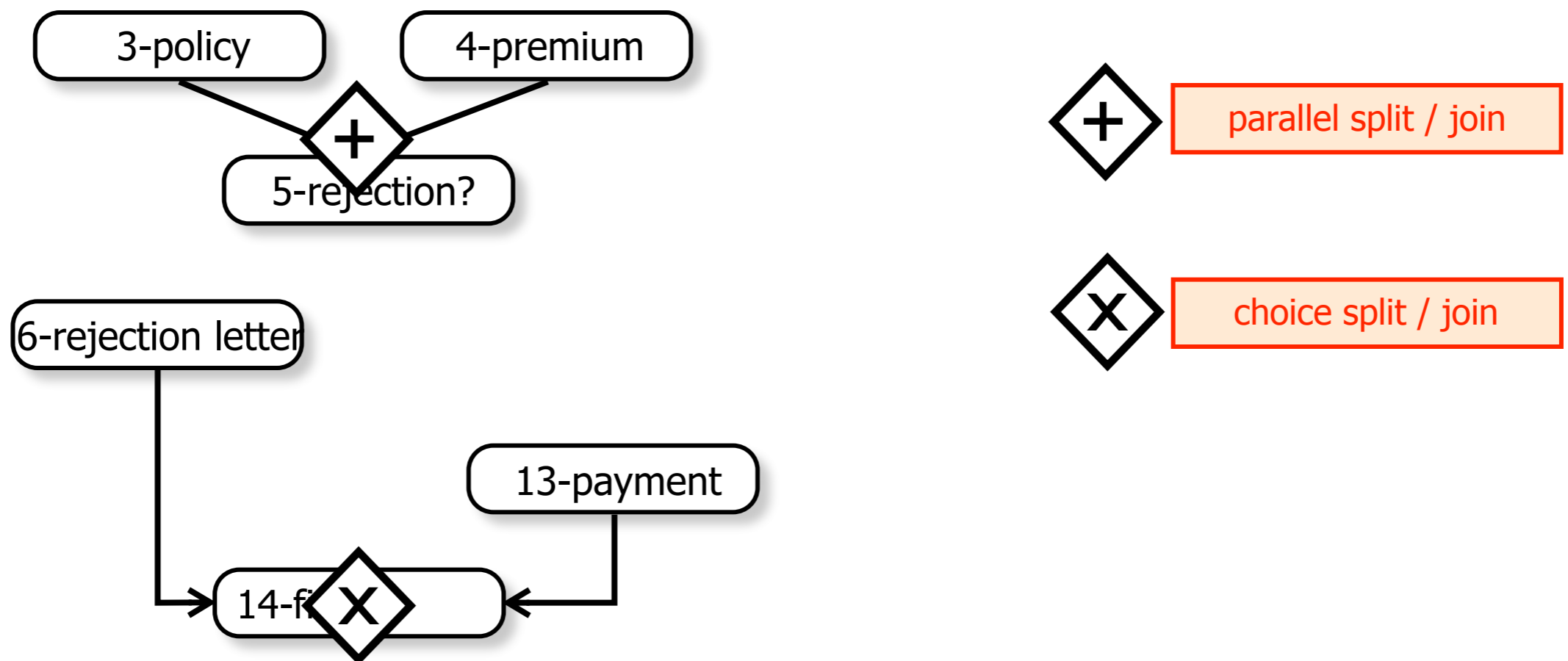
Orchestration

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

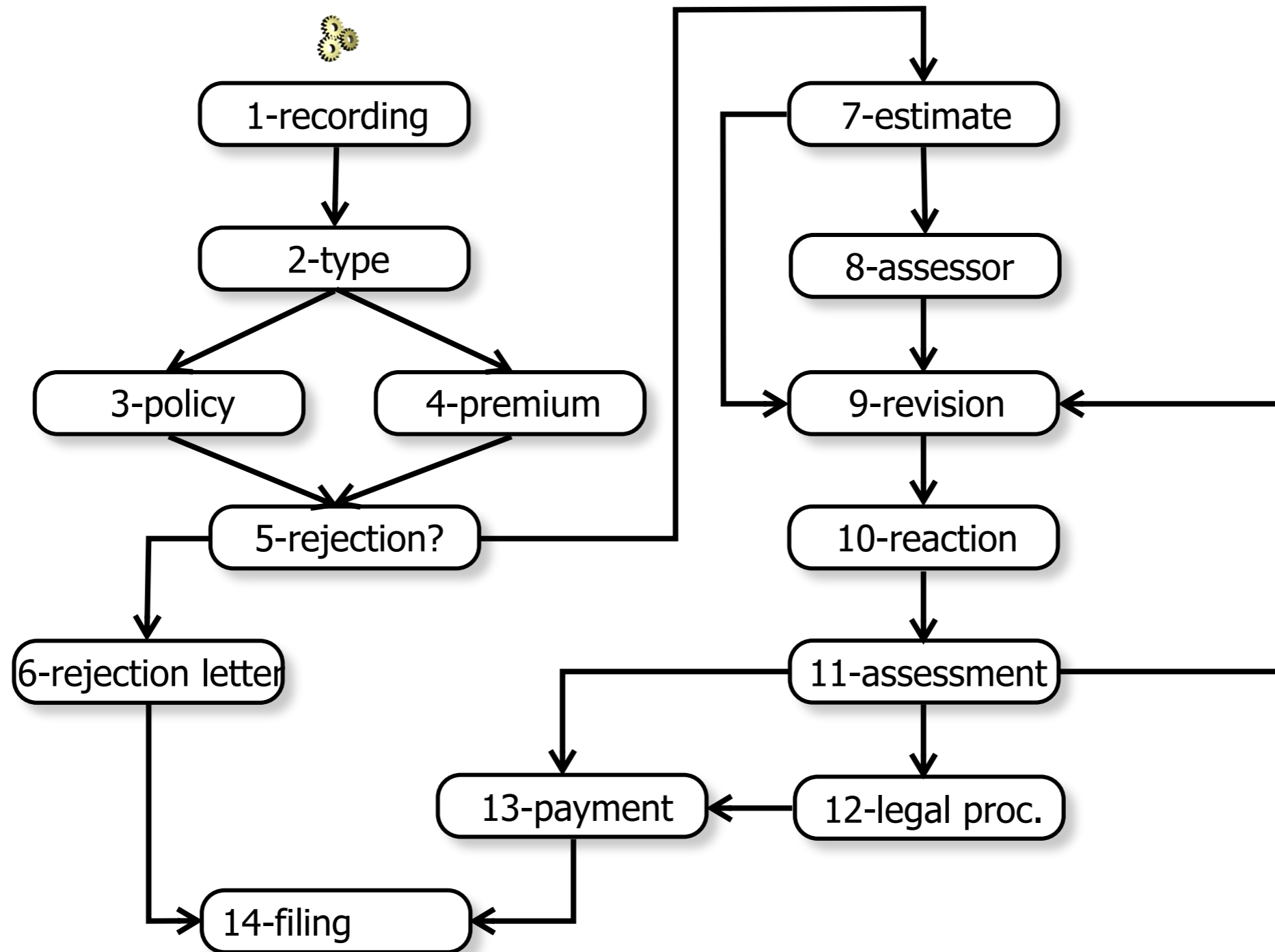This kind of control is called **orchestration**

Orchestration

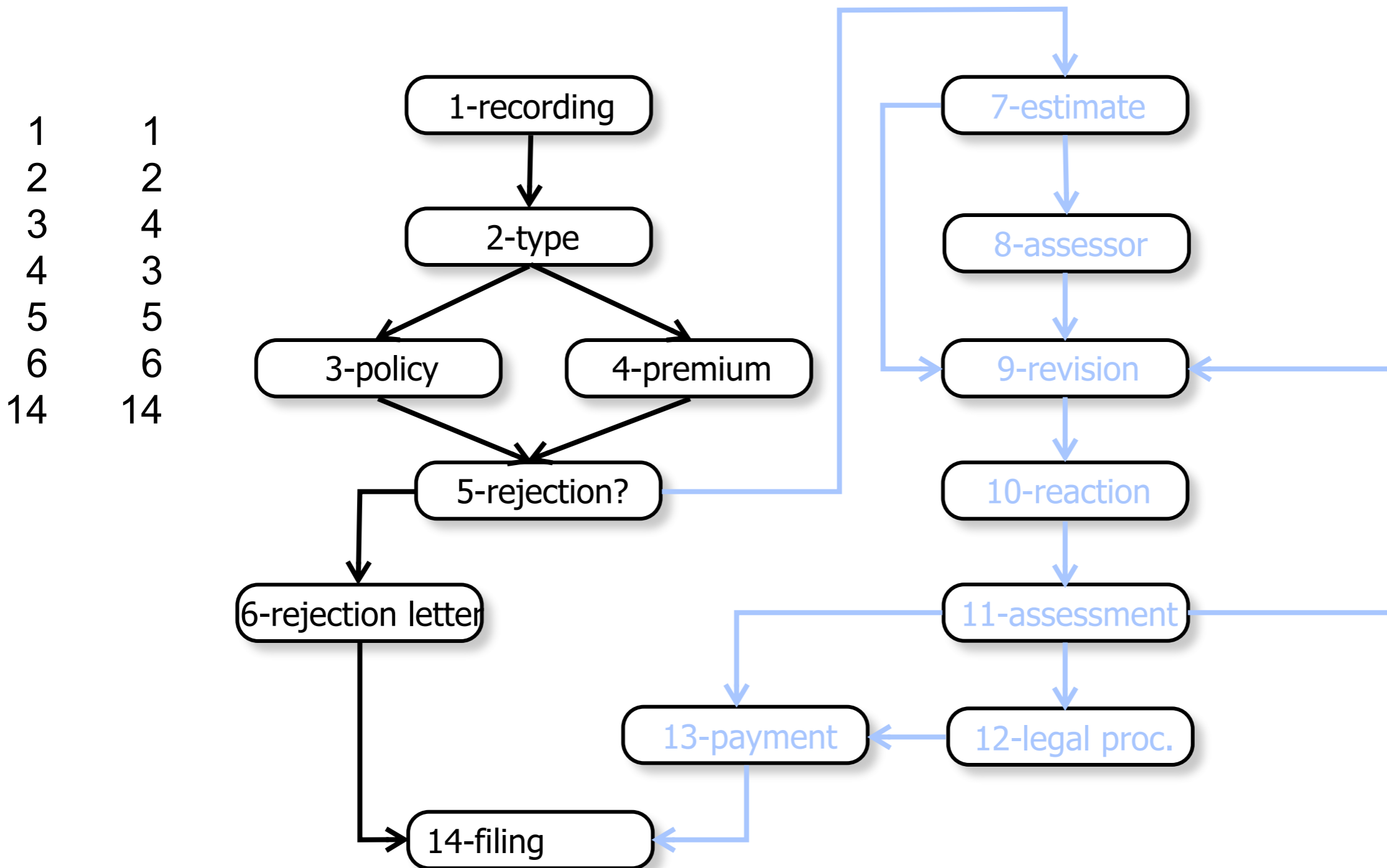Orchestration is about describing and executing a single view point model

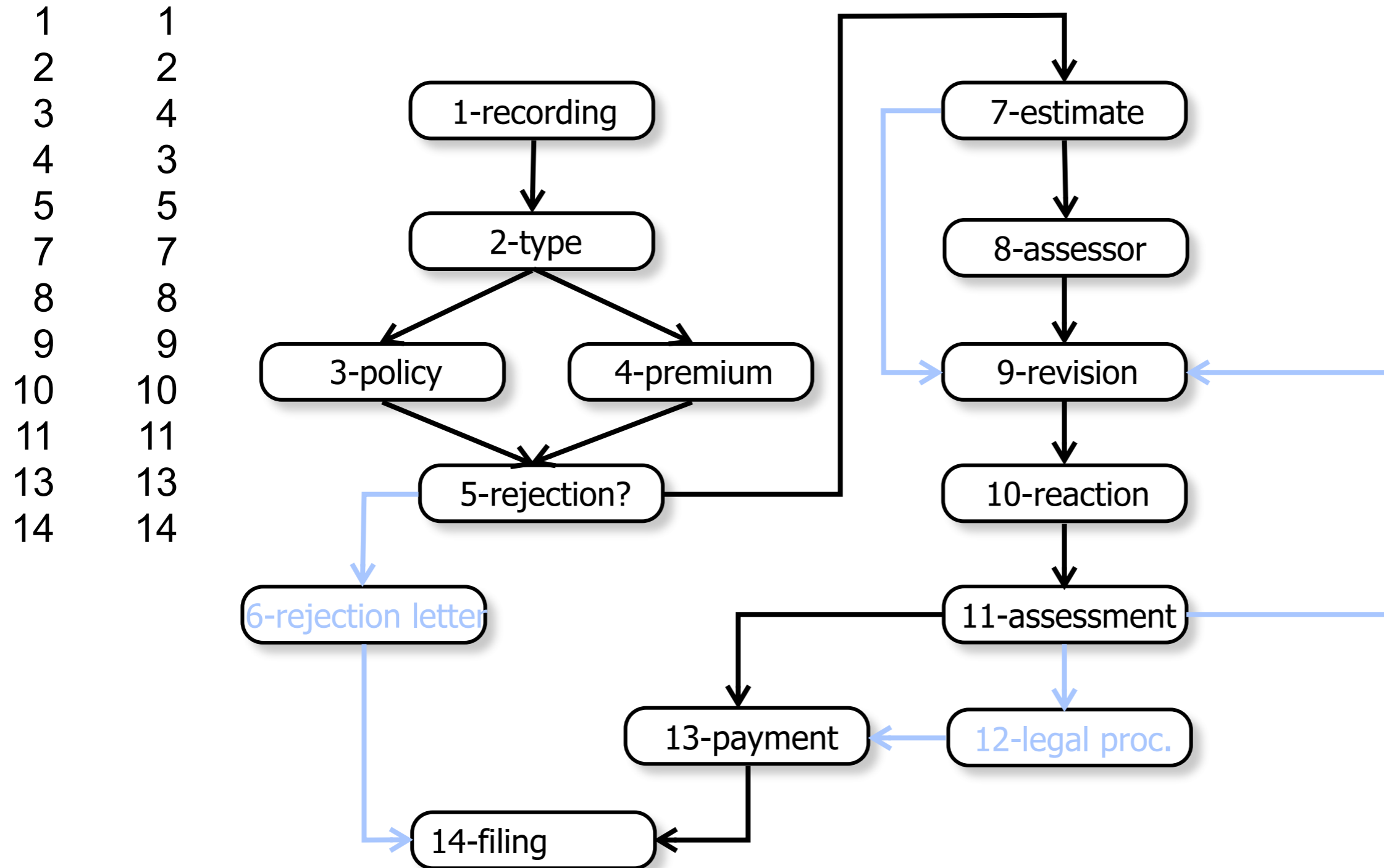The analogy is with the conductor who centrally controls the musicians in an orchestra

Executing the model

A process instance

1   1
2   2
3   4
4   3
5   5
6   6
14   14

1-recording

2-type

3-policy

4-premium

5-rejection?

6-rejection letter

14-filing

7-estimate

8-assessor

9-revision

10-reaction

11-assessment

12-legal proc.

13-payment

Another instance

1   1
2   2
3   4
4   3
5   5
7   7
8   8
9   9
10   10
11   11
13   13
14   14

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

Workflow management coalition (WfMC)

Founded in the '90s by vendors, users, academia: fix standard for Wf representation and execution

http://www.wfmc.org

Workflow

Definition: a **workflow** is the automation of a business process, in whole or in part,

during which documents, information, or tasks are passed from one participant to another for action,

according to a set of procedural rules

Workflow Management Coalition

WfMC

Workflow management system

Definition: a **workflow management system**
is a software system
that defines, creates, and manages Wfs execution,
running on one or more workflow engines,
able to interpret the workflow definition,
able to interact with workflow participants, and
able to invoke the use of IT tools and applications

Workflow Management Coalition

WfMC

Kinds of workflow

Definition: a **system workflow** consists of activities that are implemented by software systems without any user involvement

Definition: Workflows in which humans are actively involved and interact with information systems are called **human interaction workflows**.

Example: Human interaction workflow

25
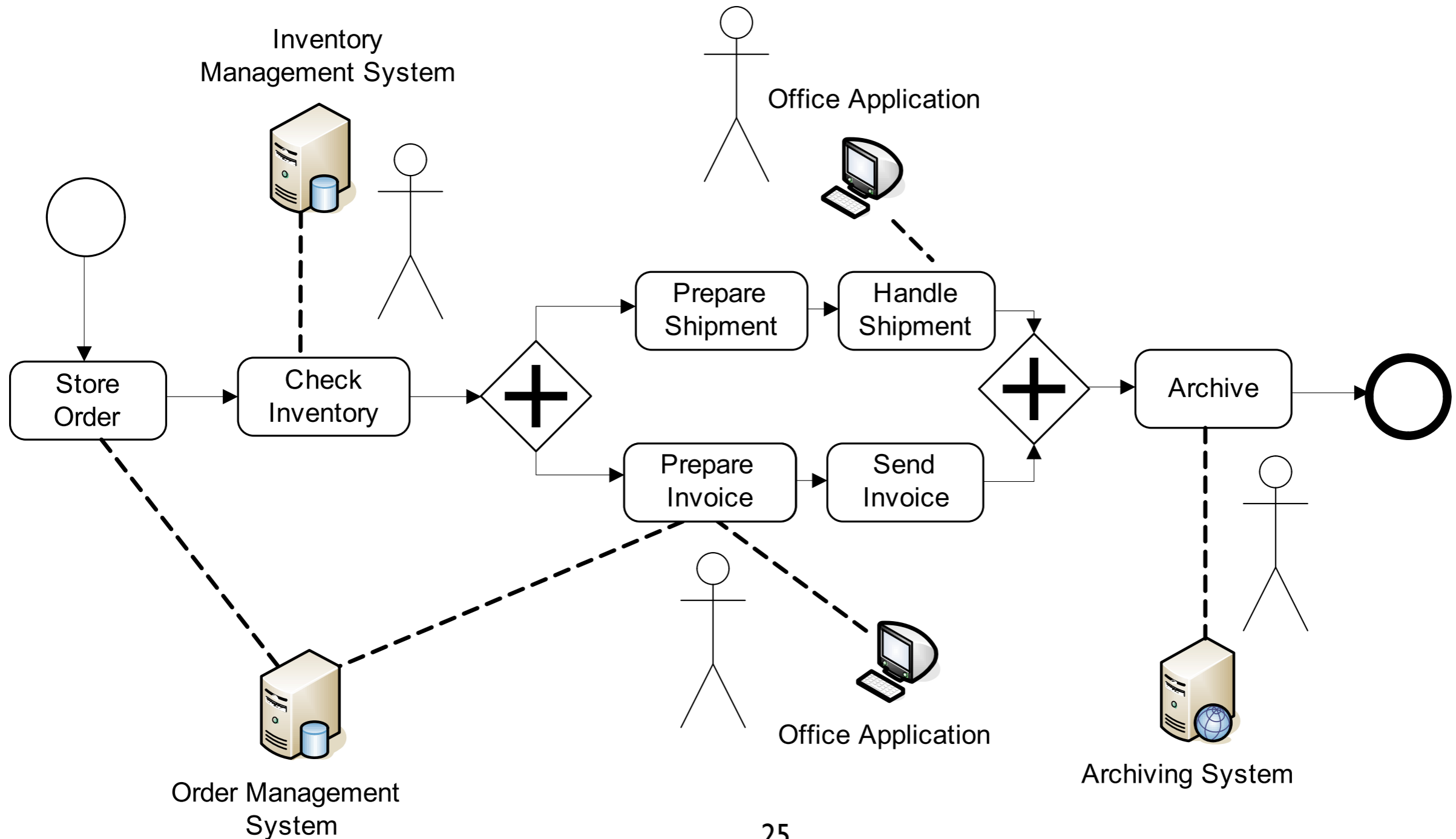
Human interaction workflows

Goal:

support automation by driving the human activities
according to the process model

Benefits:

reduce idle periods
avoid redundant work
improve human/machine work integration

Roles

Roles are groups of employees that qualify for being responsible of certain activities.

Increased flexibility:
different persons can cover the same role at different time in different cases

Human collaboration

When task performed by humans are involved in the workflow, it is not sufficient to equip workers with adequate software:

their collaboration must be supported

shared data repositories and work handover can speed-up office procedure considerably

Some limitations

Problems with knowledge workers:

User acceptance issues

Machine burdening of workers

Little room for creativity
and flexibility
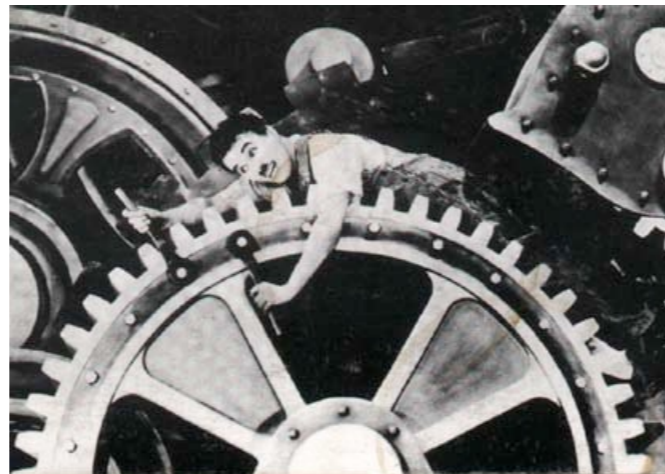
Exercise

Travel agency orchestration:
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.

Buyer & Reseller example

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

Example: Reseller
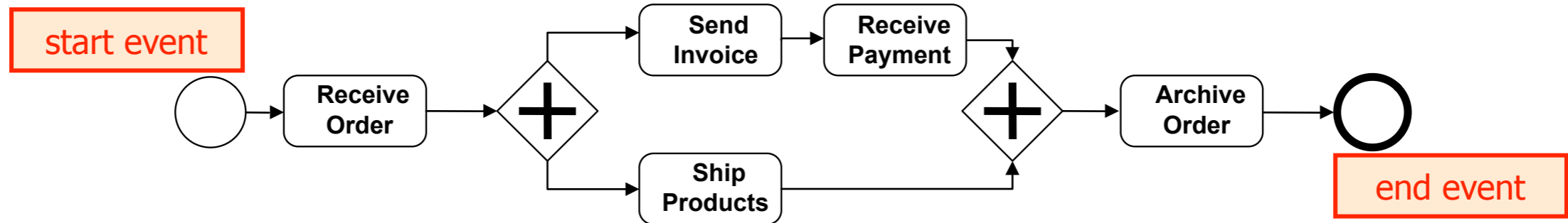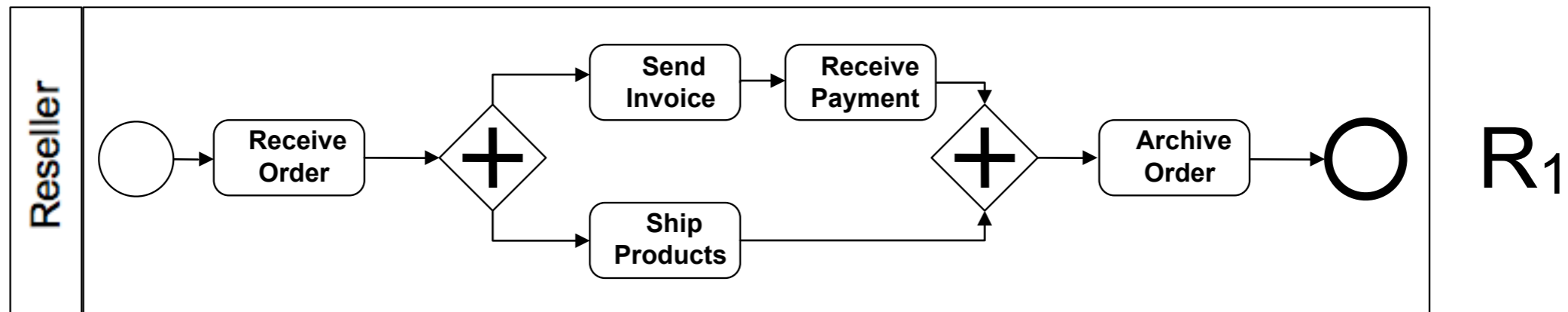
start event

We move to
BPMN-like syntax

Receive
Order

Send
Invoice

Receive
Payment

Ship
Products

Archive
Order

end event

Example: Reseller

pool
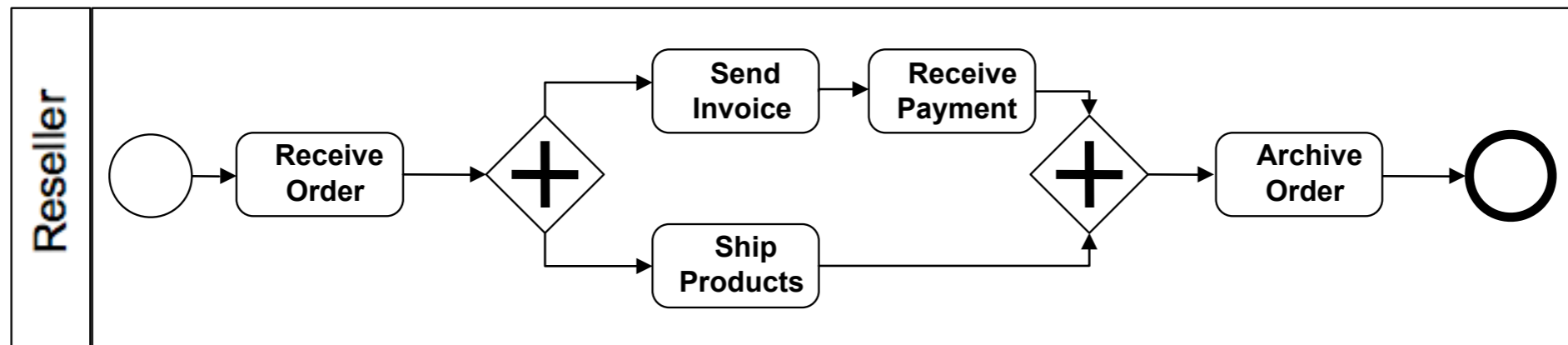
We move to
BPMN-like syntax

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

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

Example: Reseller

A reseller can use the business process model above to configure the business process management system accordingly
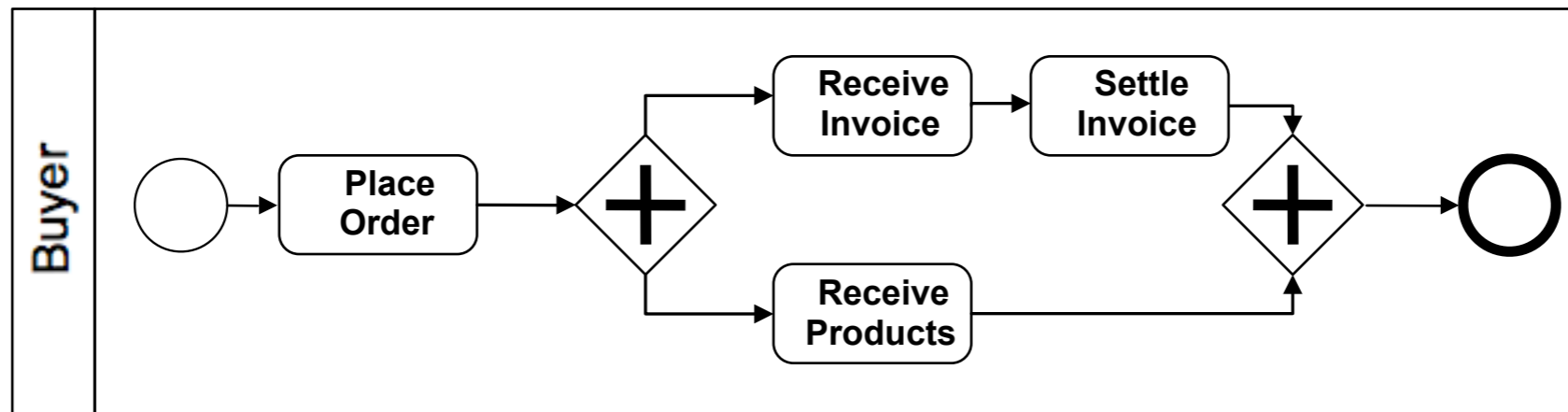
All instances will be executed as specified (after receiving the order, send and ship activites are concurrently executed)
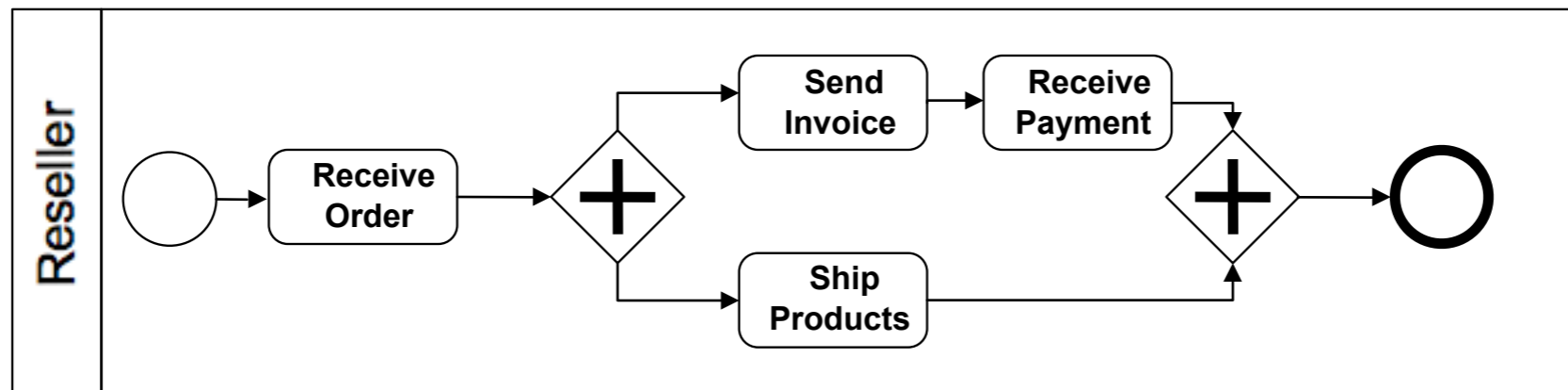
Example: Buyers

Different processes are possible, but… do they all make sense?

B_1

B_2

B_3
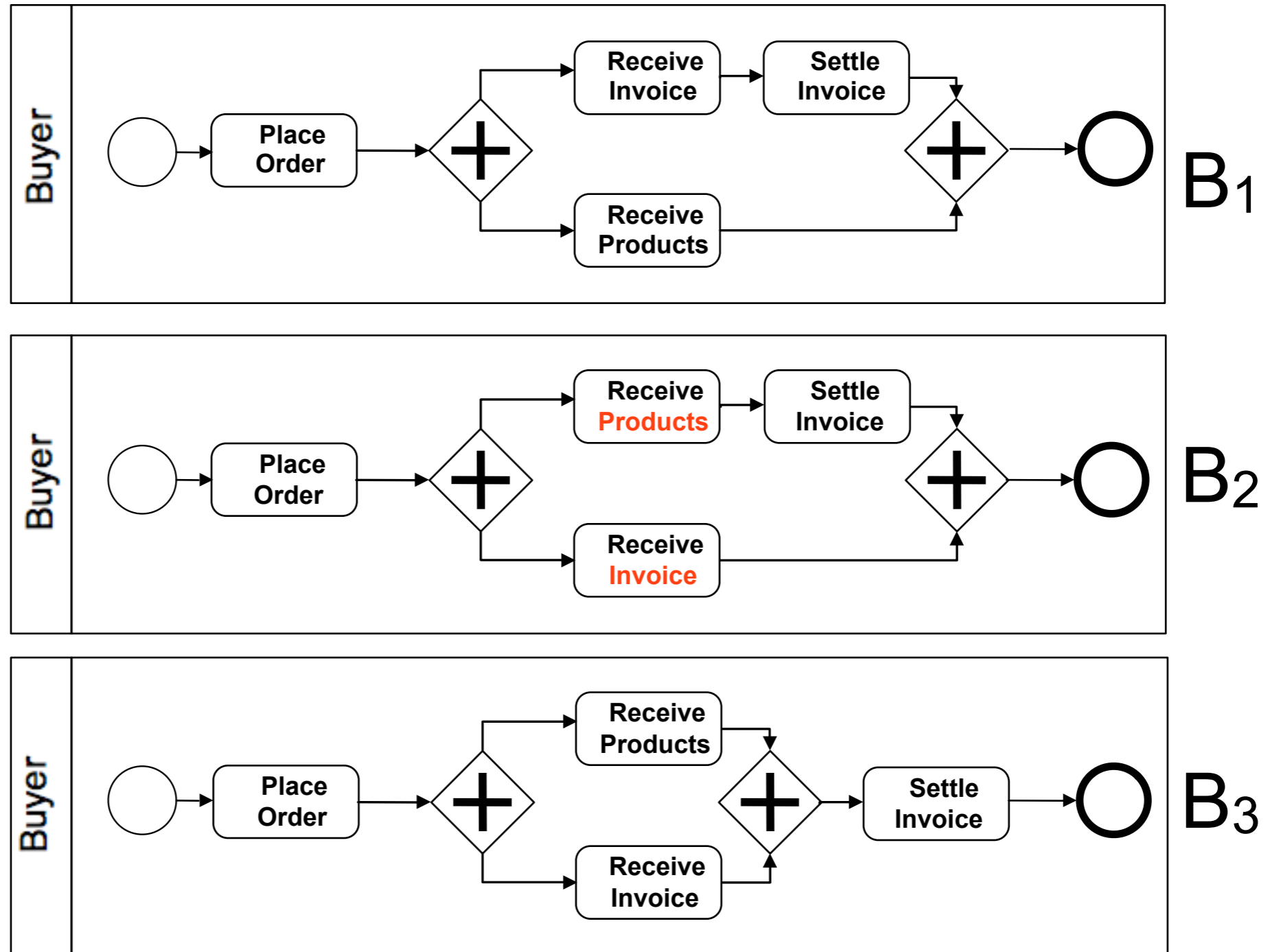
Buyer & Reseller

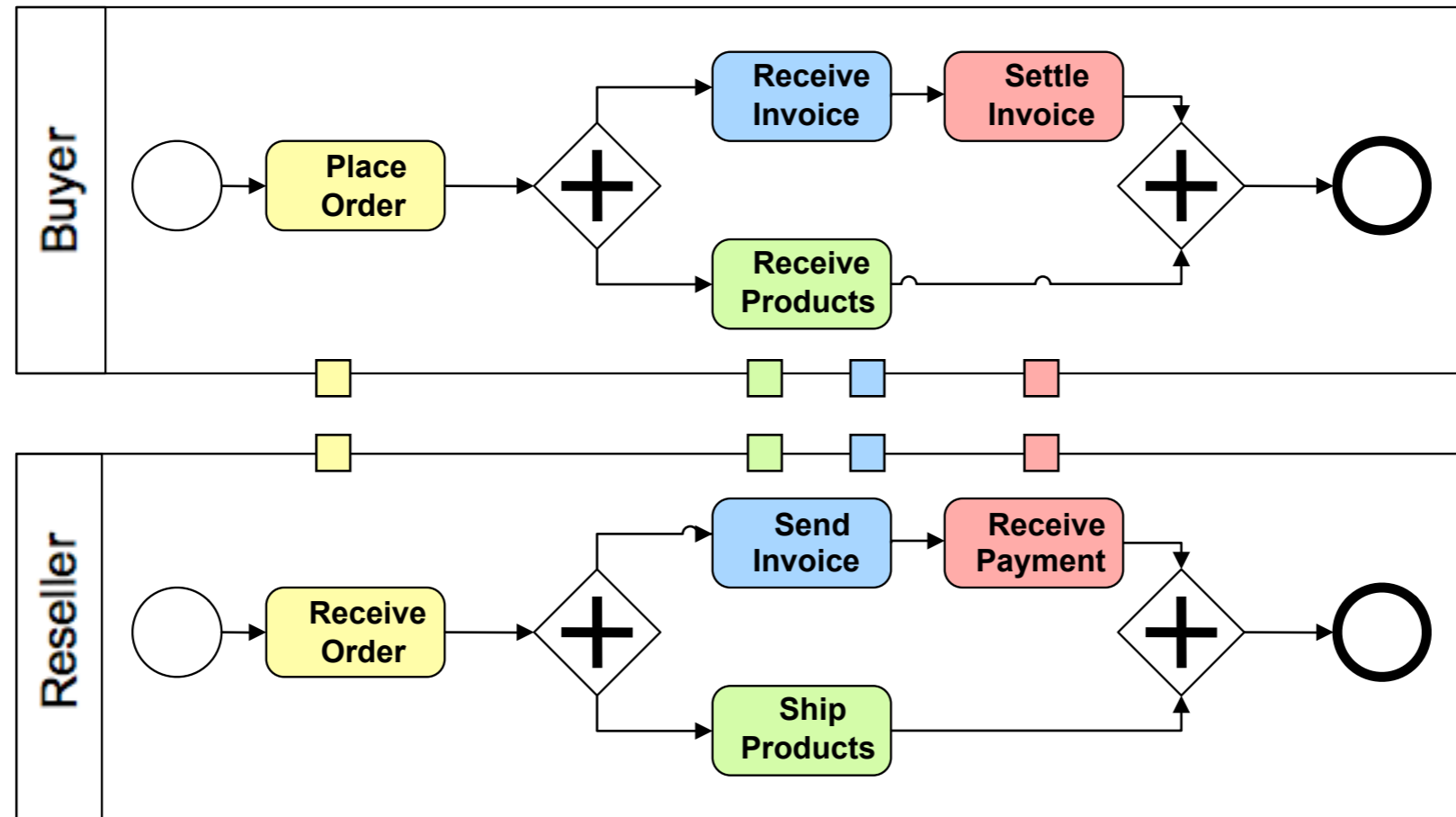Separately developed processes need to communicate!

Cross-organization interaction

Each business process is enacted by one organization

Business processes can interact with each other

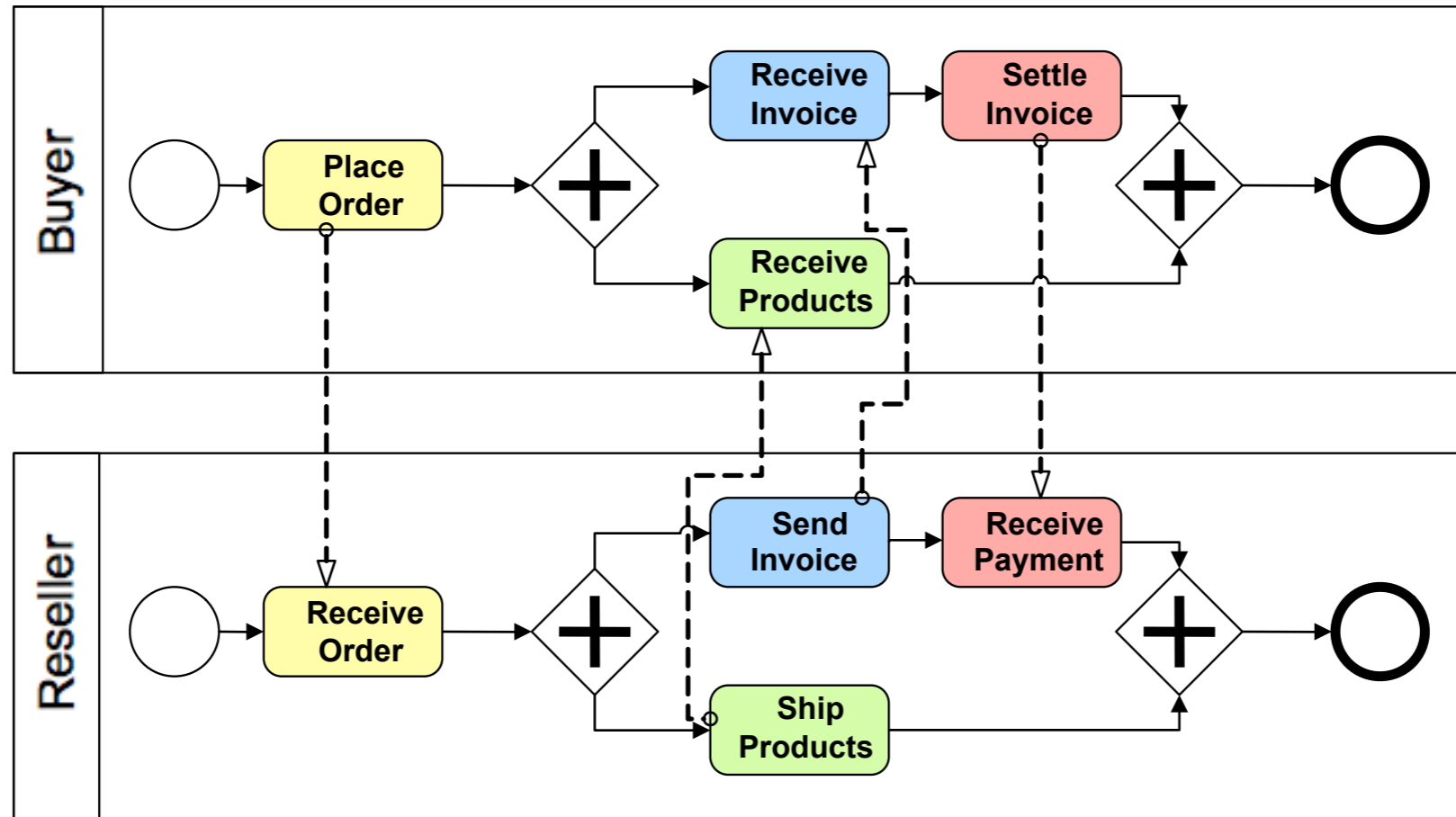Interacting activities of business processes must be related together

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

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)
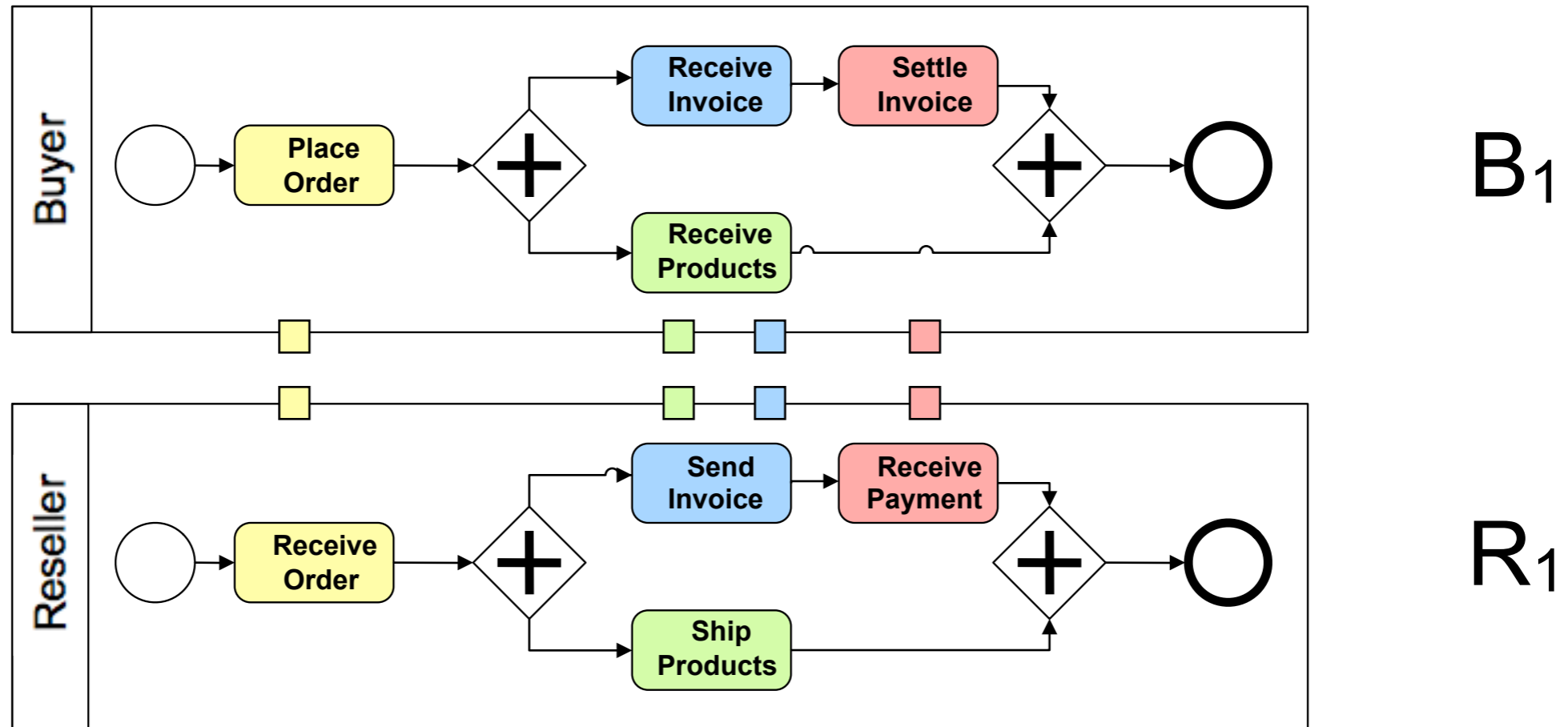
Interaction issues

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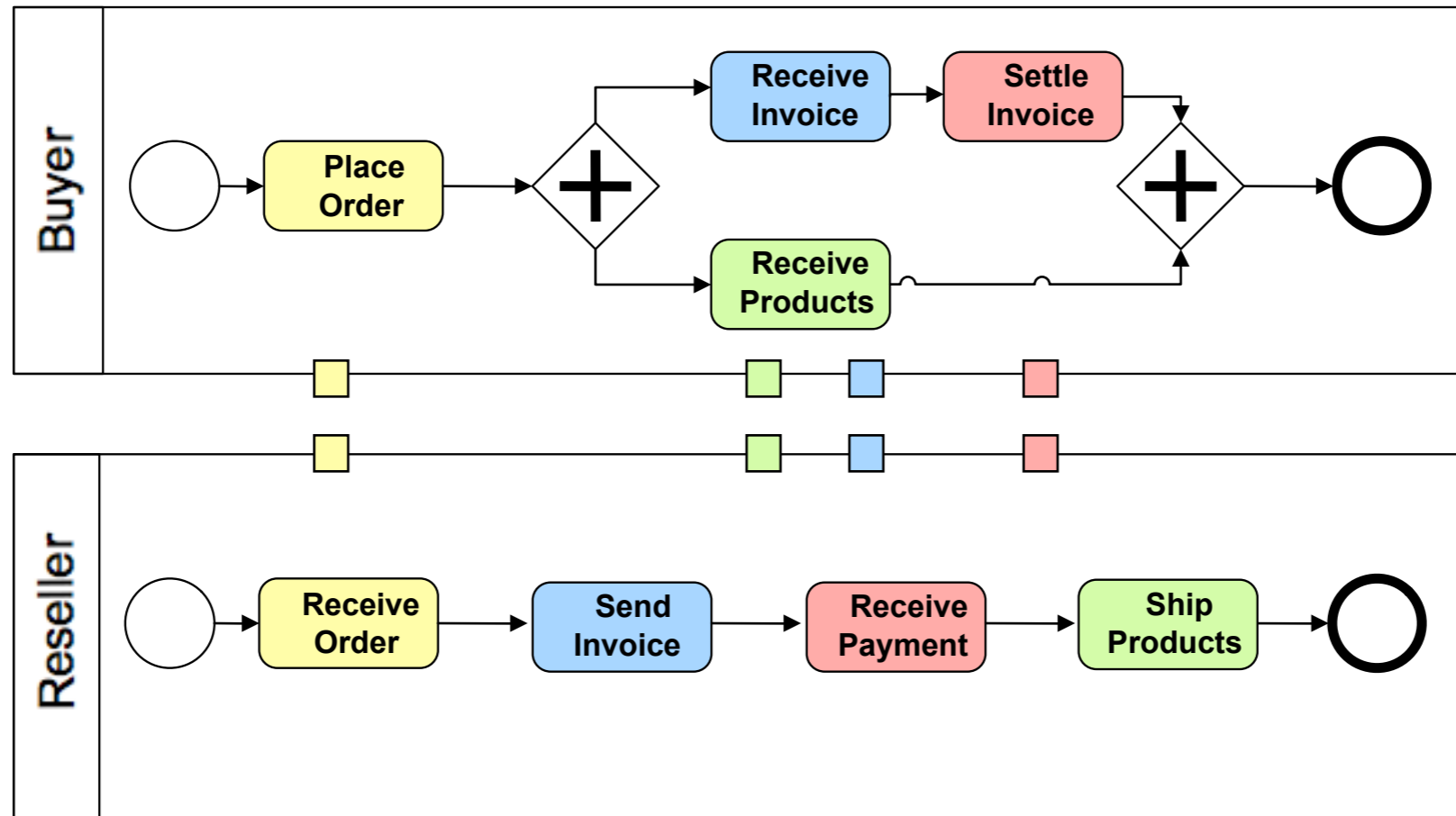
On the other hand, **if the change is not done correctly, then some problems may arise**
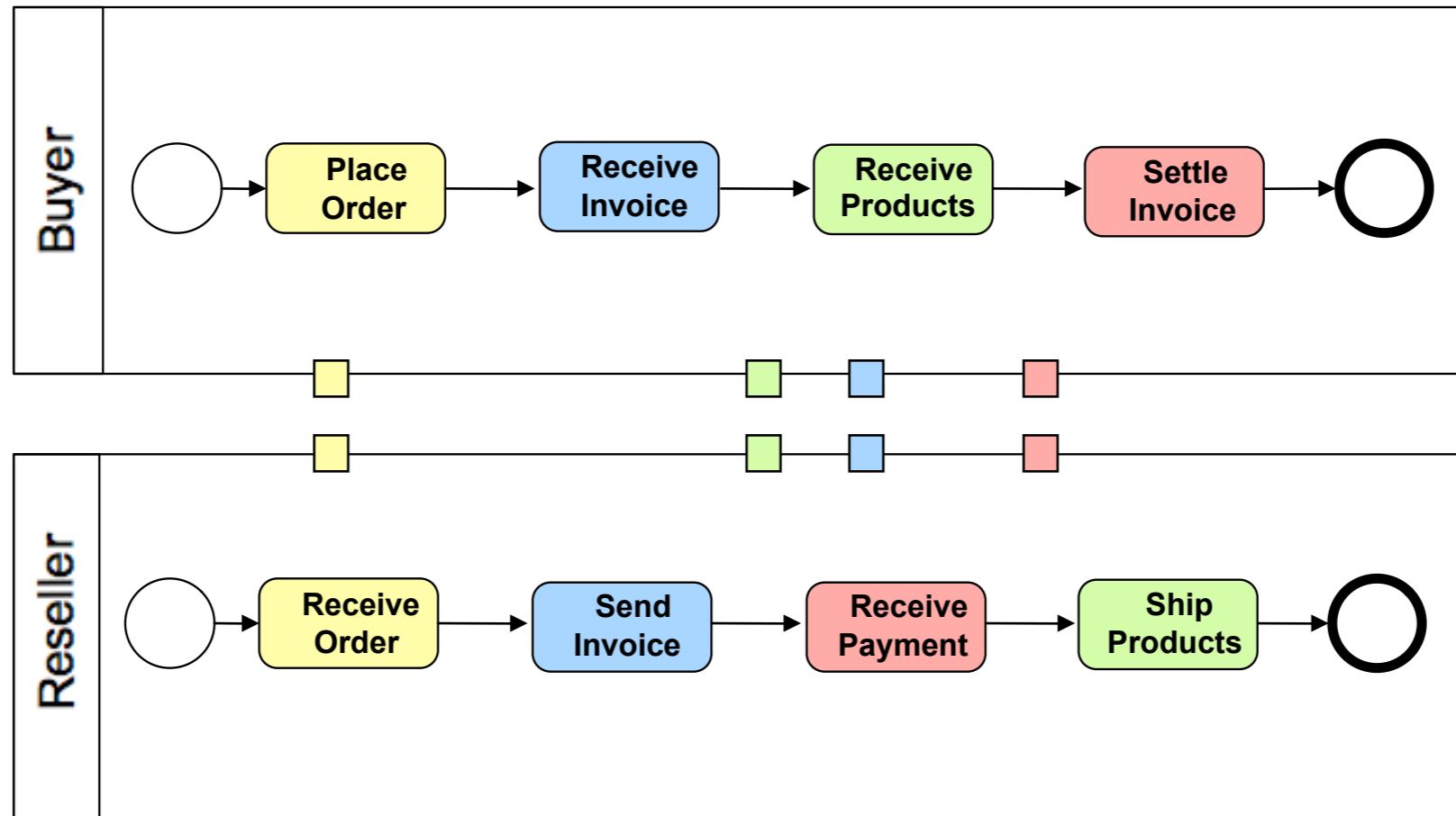
Question time

Work fine together!

Question time

B$_1$

R$_2$

Still working fine?

Question time

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 / columns to the matrix.

	B_1	B_2	B_3	B_4
R_1	ok			
R_2	ok			no
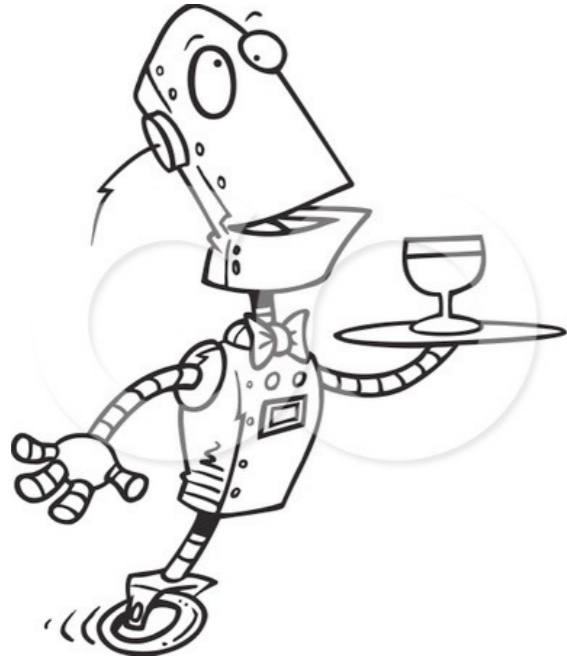
Exercise

Coffee break choreography:
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 butler robot
and a "problematic" butler robot.