

# Subject-Oriented Modeling by Construction and Restriction

# 6

## 6.1 To Go

Now I've learned in the last chapter how to model what I want, but I dread getting started! It will take quite a while before I get something on paper.



Don't worry. This is not mandatory when using the subject-oriented method! It is possible to construct a process the 'other way around'. You can start with a process where every subject can do anything it wants, and everyone communicates with everyone else. Then, just remove what is not needed step-by-step, until only the essential elements remain.

This sounds like striptease!

Hå! Hå!

Hå! Hå!

Hå! Hå!





This method is called restriction. The nice thing about restriction is that it is actually postmodern by its very nature—'anything goes ...' And this only works with S-BPM. However, in most projects, the traditional way is taken—which is also possible—it is called construction.

I like the idea! For my processes, I would like to have agility, not restrictions. My staff should not be spoon-fed, but rather guided in certain ways, and guidance should only be as tight as necessary.

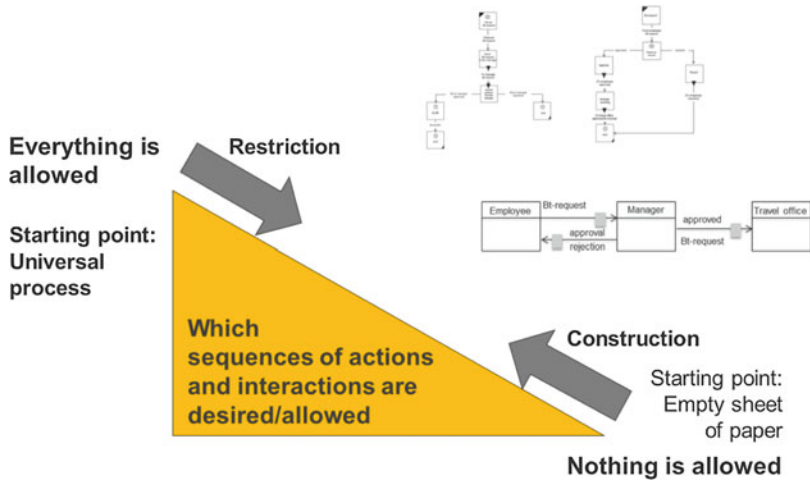


In the previous chapter, we have discussed modeling in detail. For this purpose, a variety of constructs are available. When putting them to practice, modelers can proceed along two fundamentally different ways: modeling by construction and modeling by restriction.

The method of construction is widely known: starting point is a process for which initially nothing has been clearly defined. It starts with a “blank sheet of paper”, and then a process model is “constructed”. The involved subjects, their activities, and the required business objects have to be introduced step by step. Traditional modeling approaches, such as Unified Modeling Language (UML), Business Process Model & Notation (BPMN), or event-driven process chains (EPCs), only support modeling by construction.

Modeling by restriction works differently. Its starting point is a “world” of subjects where, initially, every subject can do everything and is able to communicate with all other subjects. Modeling starts with an open model with predefined communication links between all subjects. The starting point for modeling by restriction corresponds to a picture in which, based on modern communications technology, each partner is able to exchange any information with any other partner, at any time, and at any place. This picture becomes reality, for instance, when each person can contact any other person by electronic mail (e-mail). In S-BPM, the starting point for modeling by restriction is a single “universal” process, where everyone communicates with everyone else. This process is then restricted step by step until only the desired communication relations remain. This is done by successively removing those elements, which are not required to accomplish tasks.

Figure 6.1 summarizes the fundamental modeling approaches possible with S-BPM.



**Fig. 6.1** Restriction and construction

## 6.2 Modeling by Construction

When designing a process model, the Actors begin with a “blank sheet of paper”. Using the information from analysis, the process is described step by step. The activities required for the subject-oriented approach have already been presented and are summarized here briefly:

- Description of the processes and their relationships (process network)
- Identification of the process to be described
- Identification of subjects involved in the process
- Determination of messages exchanged between the subjects
- Description of the behavior of the individual subjects
- Definition of business objects and their use

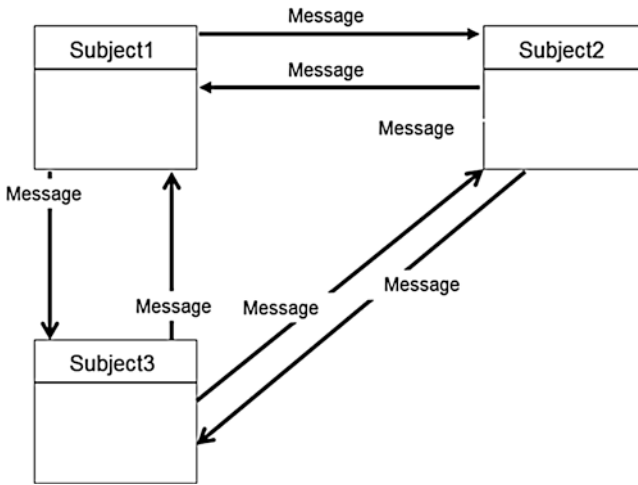
These activities need not be carried out in a strictly sequential manner. It can occur, e.g., that during the course of describing the behavior of a subject, it is discovered that another message needs to be added or removed later on. In this way, the process model is continuously expanded.

Modeling by construction is common to most modeling techniques, such as EPCs, or BPMN. However, with these, it represents the only possible approach to build models.

Start with a blank screen or sheet of paper. You should use construction when there is nothing clearly defined yet in a process. Introduce step by step the involved subjects, their activities, and business objects.

### 6.3 Modeling by Restriction

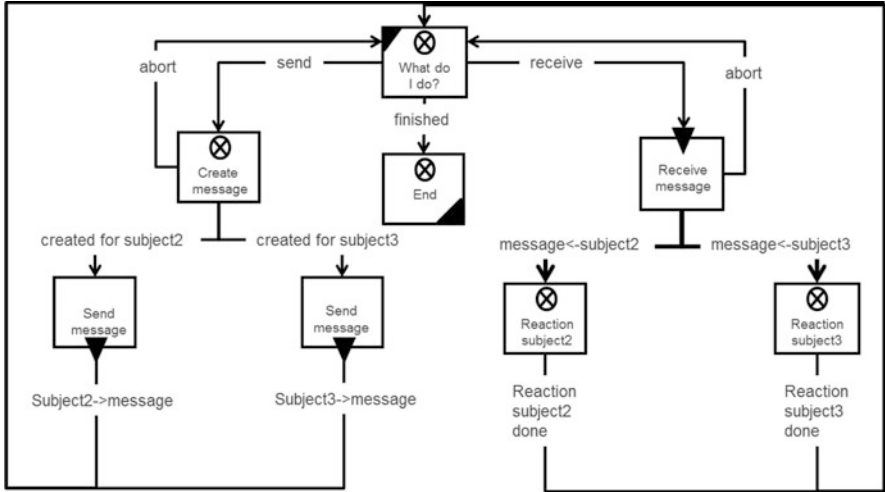
In the process model of S-BPM, besides modeling by construction, the modeler can also use modeling by restriction. In doing so, he assumes a universal process model. In a universal process model, each subject participating in a process is able to send a message to any other involved subject at any time and also receive a message from any other subject at any time, respectively. This message is labeled “message” and can, in the case of business objects, transfer any media object. The result is a universal process that is characterized by the number of its subjects. Figure 6.2



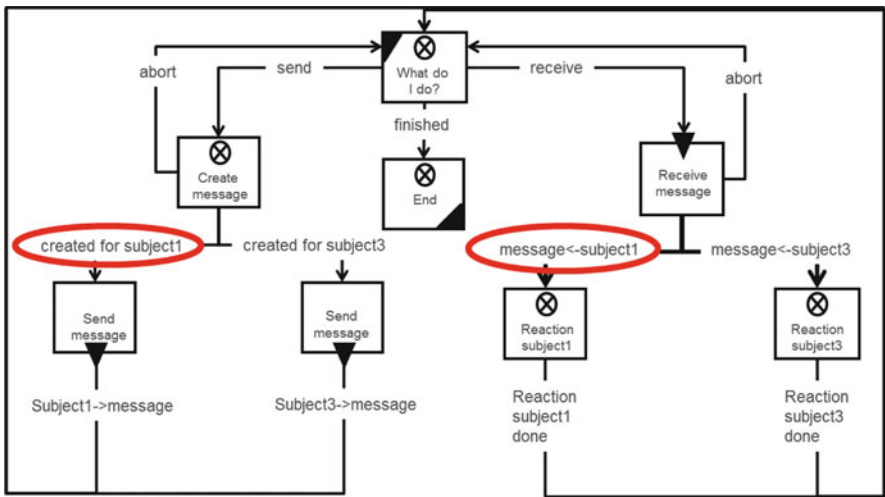
**Fig. 6.2** Universal process with three subjects

shows a universal process with three subjects.

Each subject can send messages to any other subject at any time and also receive messages accordingly. This is indicated by the respective arrows between the subject boxes. Consequently, each subject has a similar initial behavior. This is shown in Fig. 6.3. The boxes represent states of the subject; the arrows transitions associated with activities, such as “receive” depicts the transition between the state “what do I do?” and the state “receive message”.



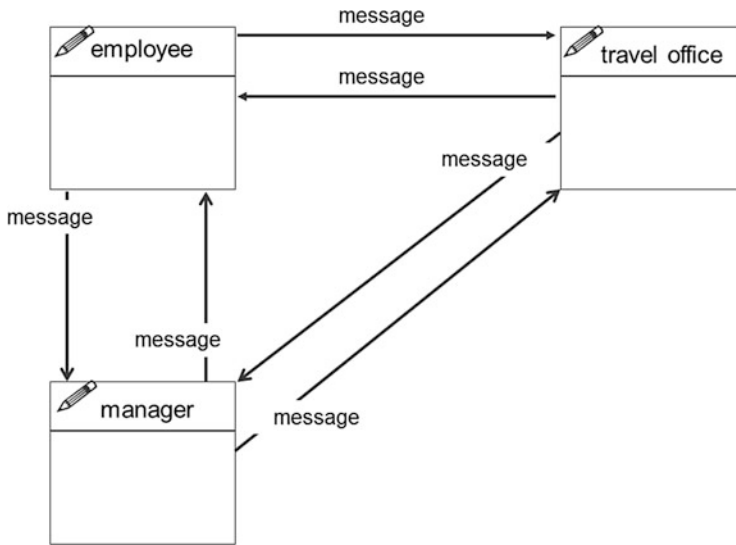
**Fig. 6.3** Initial subject behavior of Subject1 in a universal process with three subjects



**Fig. 6.4** Initial subject behavior of Subject2 in a universal process with three subjects

Subject2 and Subject3 have analogous behavior. Figure 6.4 shows the initial behavior of Subject2 as an example. The elliptical frame indicates that Subject2 was replaced by Subject1.

When more than three subjects are involved in a process, the behavioral descriptions are supplemented accordingly—a corresponding send or receive path for Subject4 is included into the behavior scheme, and so on and so forth.



**Fig. 6.5** Subject interaction diagram with subject identifiers

Based on the universal process (demonstrated for three subjects), modeling by restriction is then performed in the following five steps:

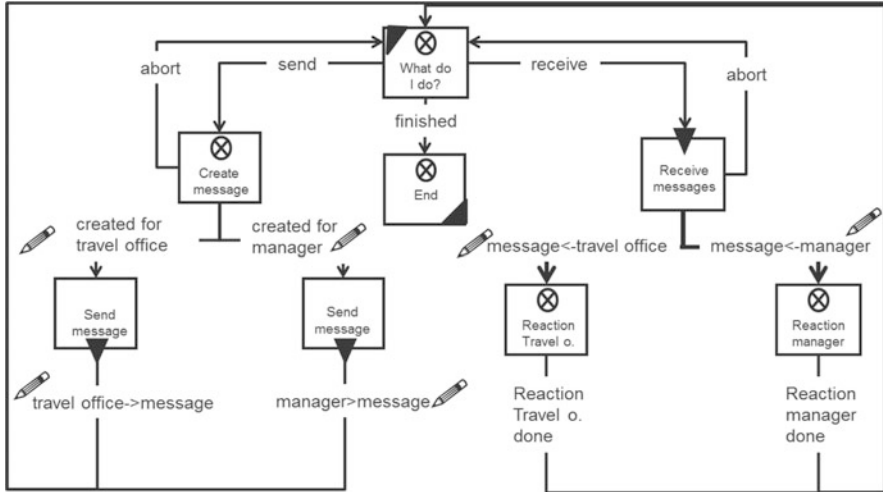
- Determine number of subjects and their identifiers
- Reduce communication paths
- Specify message types
- Adapt behavior of each subject accordingly
- Specify and refine business objects

These steps will now be detailed in the following sections. We will develop the process “business trip application” as a demonstration of modeling by restriction.

In case you already know all of the work performers accomplishing tasks (subjects), you are advised to model by restriction. Remove step by step those interaction relations that are not required for accomplishing tasks. This will lead you to an accurate specification of your organizational behavior.

### 6.3.1 Determine Number of Subjects and Subject Identifiers

We need the three subjects “employee”, “manager”, and “travel office” to model the process “business trip application”. The abstract names Subject1, Subject2, and Subject3 are replaced by these concrete subject identifiers. Figure 6.5 shows the



**Fig. 6.6** Behavior of the subject “employee” with adaption of the subject names

subject interaction diagram in which the subjects have already been renamed. The modification is highlighted using the pencil icon.

After renaming the subjects, their behavior has to be adapted. Figure 6.6 shows the required changes for the subject “employee” (previously Subject1).

### 6.3.2 Reduce Communication Paths

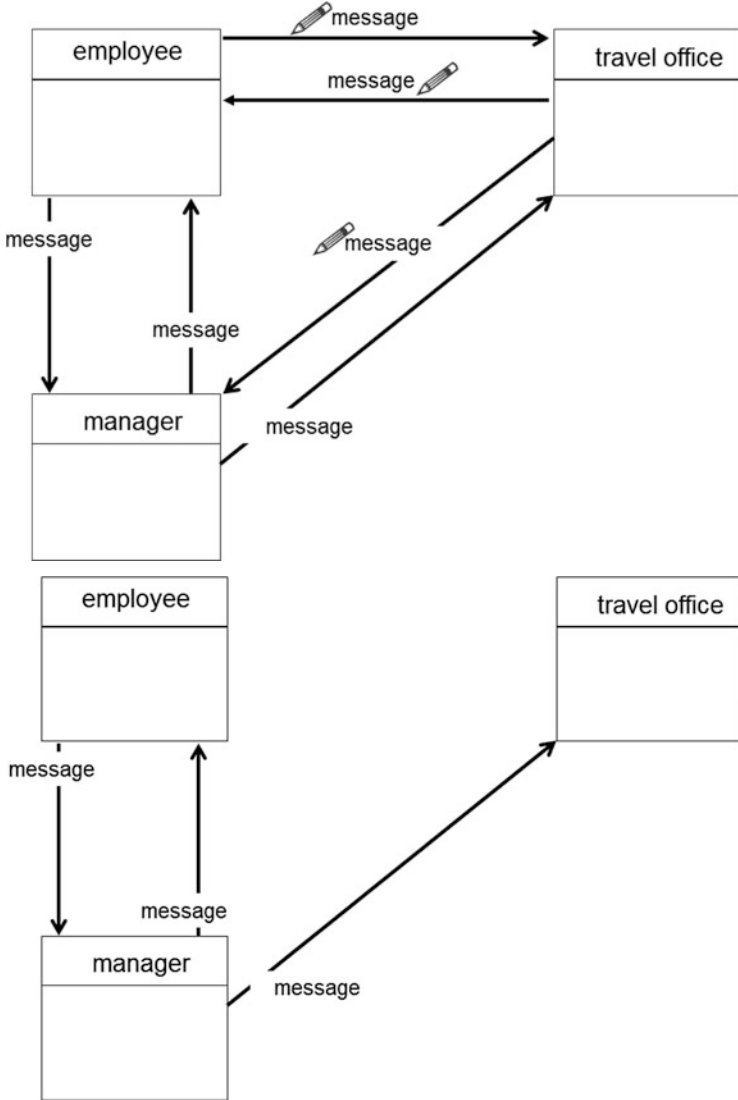
So far, each subject is able to communicate with every other subject. In the target process, in order to achieve a work result, many of these communication relationships are not necessary. Therefore, they need to be removed from the process model. In the upper part of Fig. 6.7, the communication structure before elimination is shown. Below this, the new structure after removal of the communication relationships not required for handling business trip applications is illustrated.

Due to the removal of communication relationships, the behavior of the affected subjects also needs to be adjusted. Figure 6.8 shows the behavior of the subject “employee” prior to the change. The circled paths for sending and receiving messages to the subject “travel office” need to be removed.

Figure 6.9 shows the behavior after removal of the corresponding behavior paths.

### 6.3.3 Specify Message Types

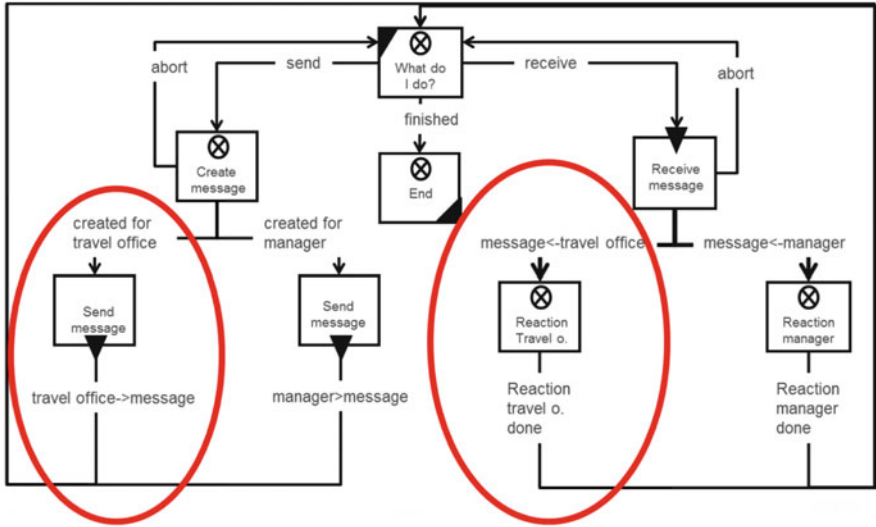
In the next step, the messages are reduced to the necessary content. It is determined for each communication what information needs to be transmitted. The hitherto open transmission interface “message” is tailored to the content required for the process.



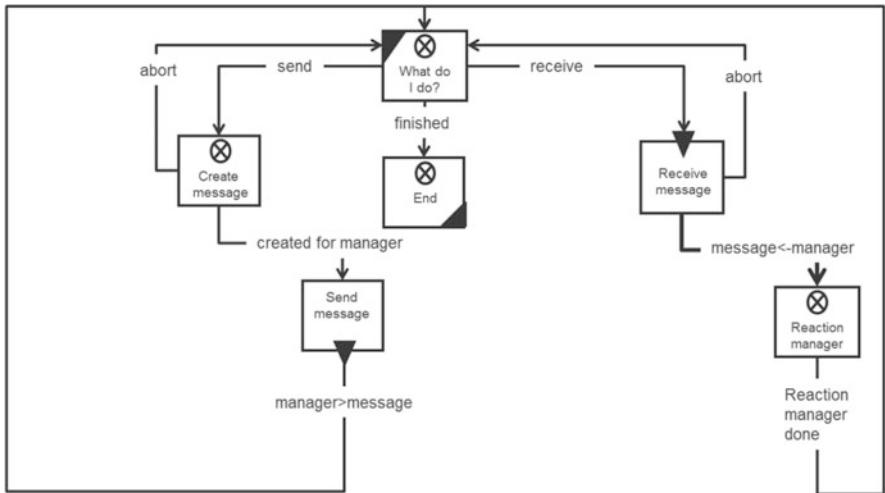
**Fig. 6.7** Removing dispensable communication relationships—before and after removal

Figure 6.10 shows the customized communication structure. The general message “message” is no longer exchanged between the employee and manager subject. The employee sends the message “business trip request” to the manager, and he sends either the message “approval”, or “rejection” (instead of “message”) back.



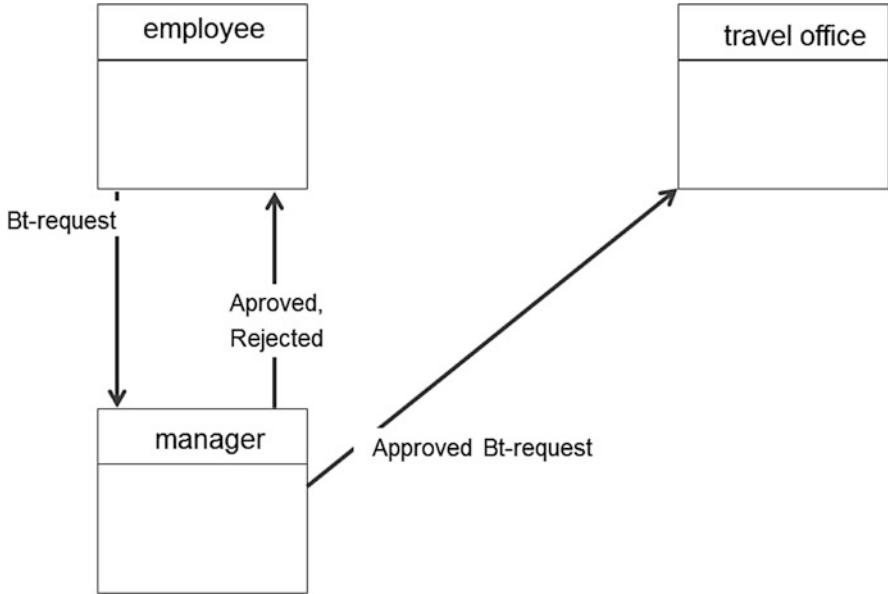


**Fig. 6.8** Behavior specification prior to removal of communication links that are not required for task accomplishment

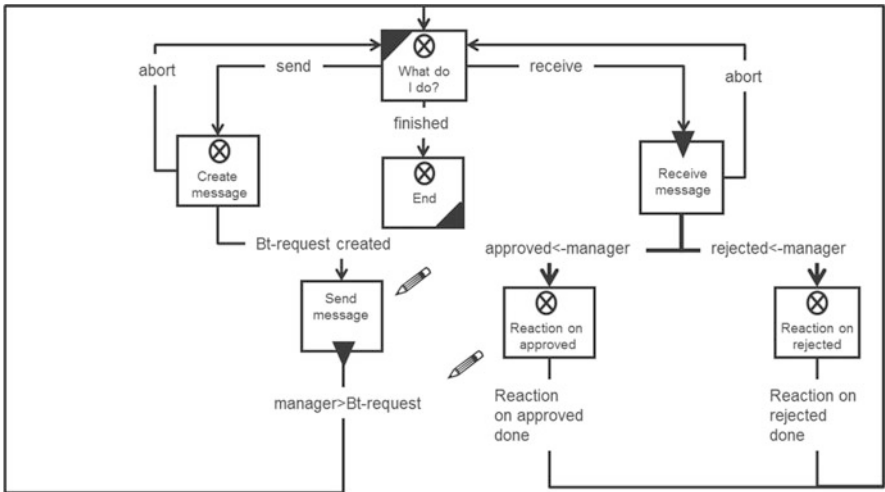


**Fig. 6.9** Behavior specification after removal of dispensable communication links

When renaming or splitting the general (unified) message, the behavior of subjects has to be adapted accordingly. Figure 6.11 shows the corresponding changes. In the left half of the behavior diagram, the message with the modified



**Fig. 6.10** Communication structure with application-specific message types



**Fig. 6.11** Behavior with adapted message types

name has already been included. In the reception branch, the message type “message” has been divided into the message types “rejection” and “approval”.

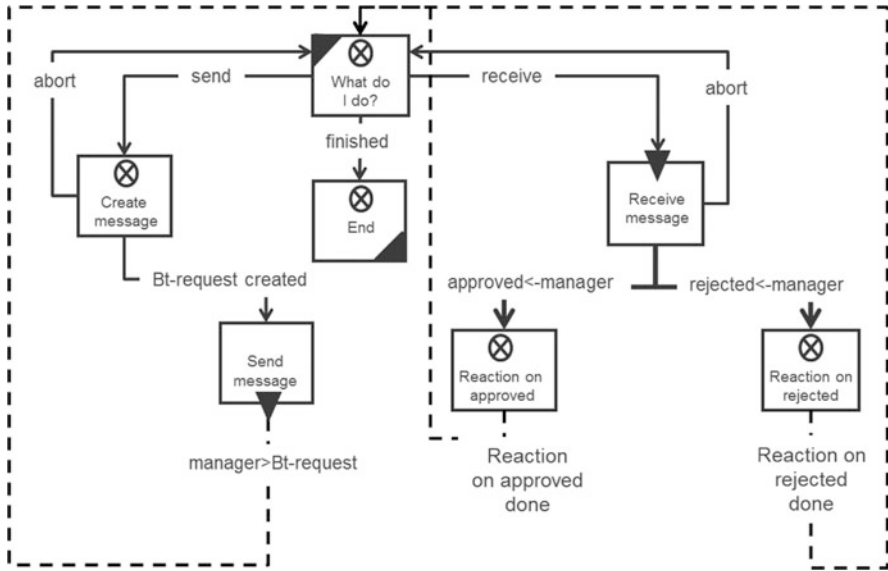


Fig. 6.12 Subject behavior including behavior paths that are not required (dashed lines)

### 6.3.4 Adapt Behavior of Subjects Accordingly

So far, all subjects in the process model could send and receive messages in any order. Thus, the subject “employee” could send the message “Bt-request” as often as desired to the subject “manager”. In addition, the subject “employee” should only start waiting for a message from the subject “manager” after having sent the “Bt-request” message. After receiving the message “approval” or “rejection”, the end state should be reachable.

Figure 6.12 shows the behavior of the subject “employee” in which the unnecessary behavior paths are represented as dashed lines.

The paths not required are removed and replaced with the desired behavior. After sending the message “Bt-request”, the state “receive message” can be entered. The transition from the state “what do I do?” to the state “receive message” can be removed. This amendment ensures that the message “Bt-request” is sent only once, and then a corresponding answer is awaited.

The transitions from the states “reaction on rejected” and “reaction on approved” to the state “what do I do?” are also removed, and instead transitions to the state “end” are added. This modification ensures that the particular process or its instance terminates after a respective response has been received.

Figure 6.13 shows the specifically adapted behavior of the subject “employee”.

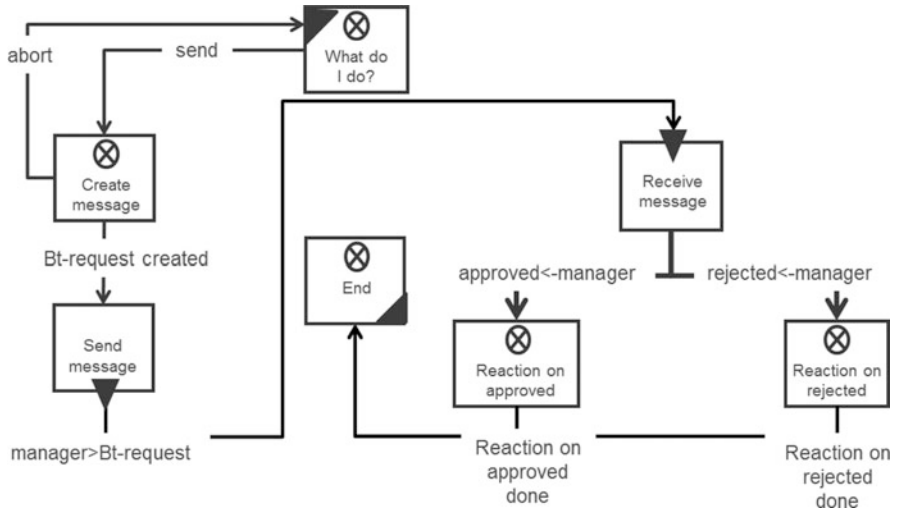


Fig. 6.13 Adjusted behavior of the subject “employee”

Field	Content
Name	
Surname	
Start trip	
Finished trip	
Customer/Destination	
Reason	

Fig. 6.14 Structure of the business object for the message type “Bt-request”

### 6.3.5 Specify and Refine Business Objects

When using the message type “message”, a universal business object “blank sheet of paper” is transmitted. In this business object, the data to be transmitted can be entered without any formal restrictions. This informal data entry is restricted when using application-specific message types. For each message type, a business object is defined which allows the desired information to be transmitted in a certain format when the corresponding message type is transferred from sender to receiver. Figure 6.14 shows the business object that is transmitted when sending the message “Bt-request”.

When using the messages “approved” or “rejected”, the business object “blank sheet of paper” continues to be transferred. On demand, the manager can enter here the reasons for his decision, or any other information, without format restrictions. The example shows that the message types and business objects required for task accomplishment can be defined in parallel.

---

## 6.4 Evaluation

S-BPM is the only known approach enabling both traditional modeling by construction and innovative modeling by restriction.

Since process modeling requires some cognitive effort and methodological interventions, such as interviews and prototyping, describing processes is often accompanied by misunderstandings. The consistent use of message-based interaction helps to avoid misunderstandings by ensuring the integrity of interaction flows. The main task in comprehensive business process management is the transformation of business processes to communication relationships between work performers (subjects).

The methodical guideline represented by the six steps outlined in Sect. 6.2 provides a means for narrowing down an S-BPM-process pattern to valid patterns of interaction. This enables stringent achievement of work outcomes. This restriction, by focusing on simple interaction relations, helps to increase acceptance for the modeling of business processes and also ensures the usability of the S-BPM method.

---

## Reference

Fleischmann, A., Stary, Ch., Whom to Talk to? A Stakeholder Perspective on Business Processes, in: *Universal Access in the Information Society*, Springer, Vol. 11, No. 3, 2011.

**Open Access.** This chapter is distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.