

# COLLABORATIONS

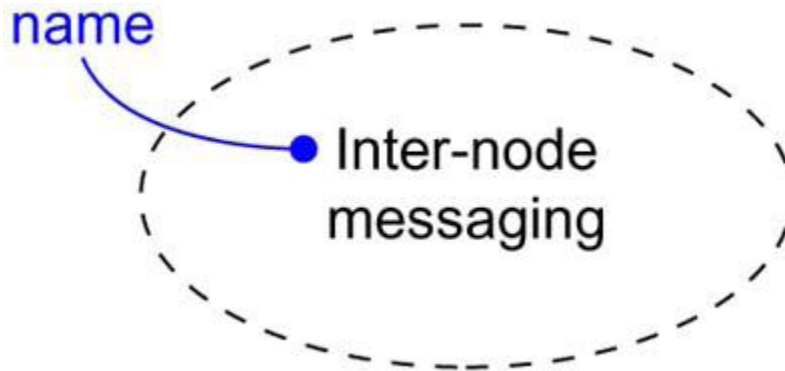


Figure 1: Collaborations

- A collaboration is a society of classes, interfaces, and other elements that work together to provide some cooperative behavior that's bigger than the sum of all its parts.
- A collaboration is also the specification of how an element, such as a classifier (including a class, interface, component, node, or use case) or an operation, is realized by a set of classifiers and associations playing specific roles used in a specific way.
- Collaboration names a conceptual chunk that encompasses both static and dynamic aspects.
- A collaboration gives a name to the conceptual building blocks of your system, encompassing both structural and behavioral elements.
- Graphically, a collaboration is rendered as an ellipse with dashed lines as in Figure 1
- collaboration name must be unique within its enclosing package

## Structure

- Collaborations have two aspects: a structural part that specifies the classes, interfaces, and other elements that work together to carry out the named collaboration, and a behavioral part that specifies the dynamics of how those elements interact.
- a collaboration may cut across many levels of a system
- An element may appear in more than one collaboration
- Figure 2: shows Structural Aspects of a Collaboration

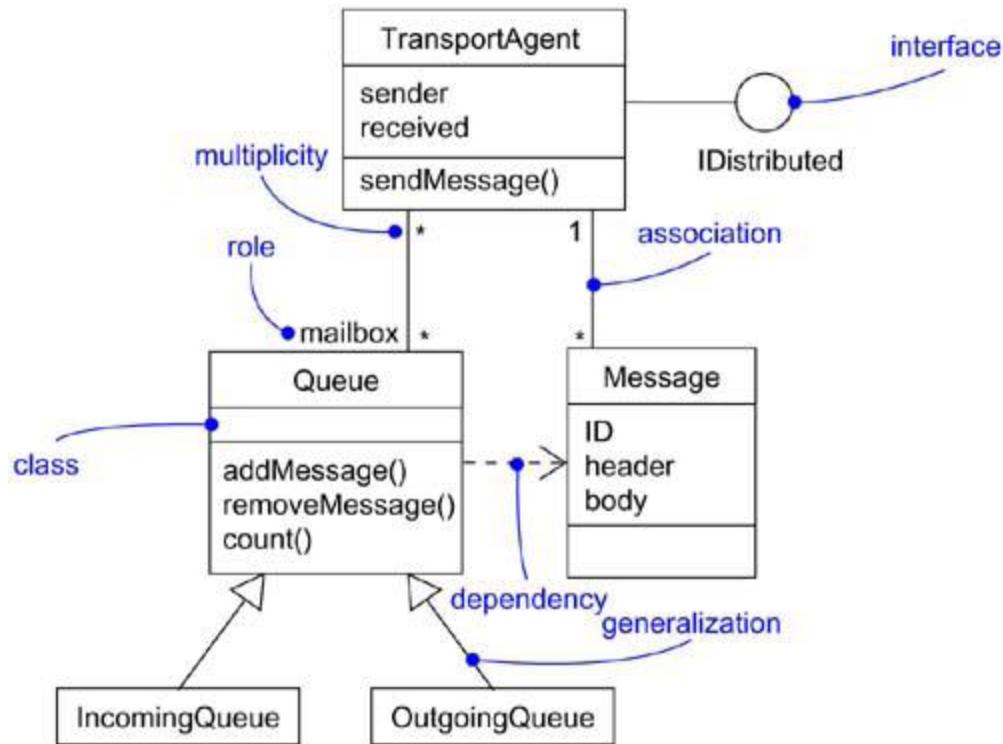


Figure 2: Structural Aspects of a Collaboration

### Behavior

- structural part of a collaboration is typically rendered using a class diagram, the behavioral part of a collaboration is typically rendered using an interaction diagram
- to emphasize the time ordering of messages, use a sequence diagram
- to emphasize the structural relationships among these objects as they collaborate, use a collaboration diagram
- Figure 3: shows Behavioral Aspects of a Collaboration
- the objects found in a collaboration's interactions must be instances of classes found in its structural part

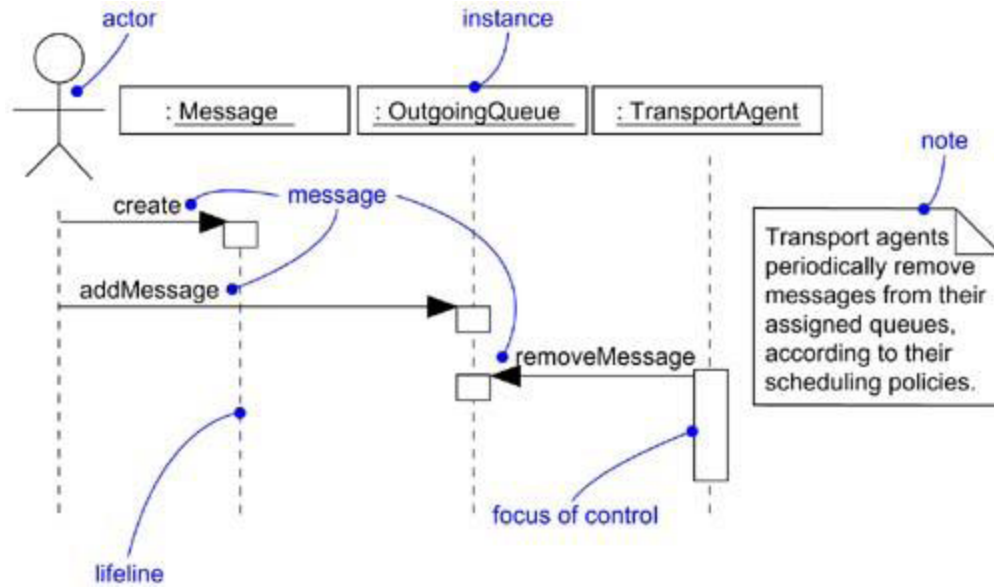


Figure 3: Behavioral Aspects of a Collaboration

### Organizing Collaborations

A collaboration may realize either a classifier or an operation, which means that the collaboration specifies the structural and behavioral realization of that classifier or operation. The relationship between a classifier or an operation and the collaboration that realizes it is modeled as a realization relationship.

Figure 4: shows Organizing Collaborations

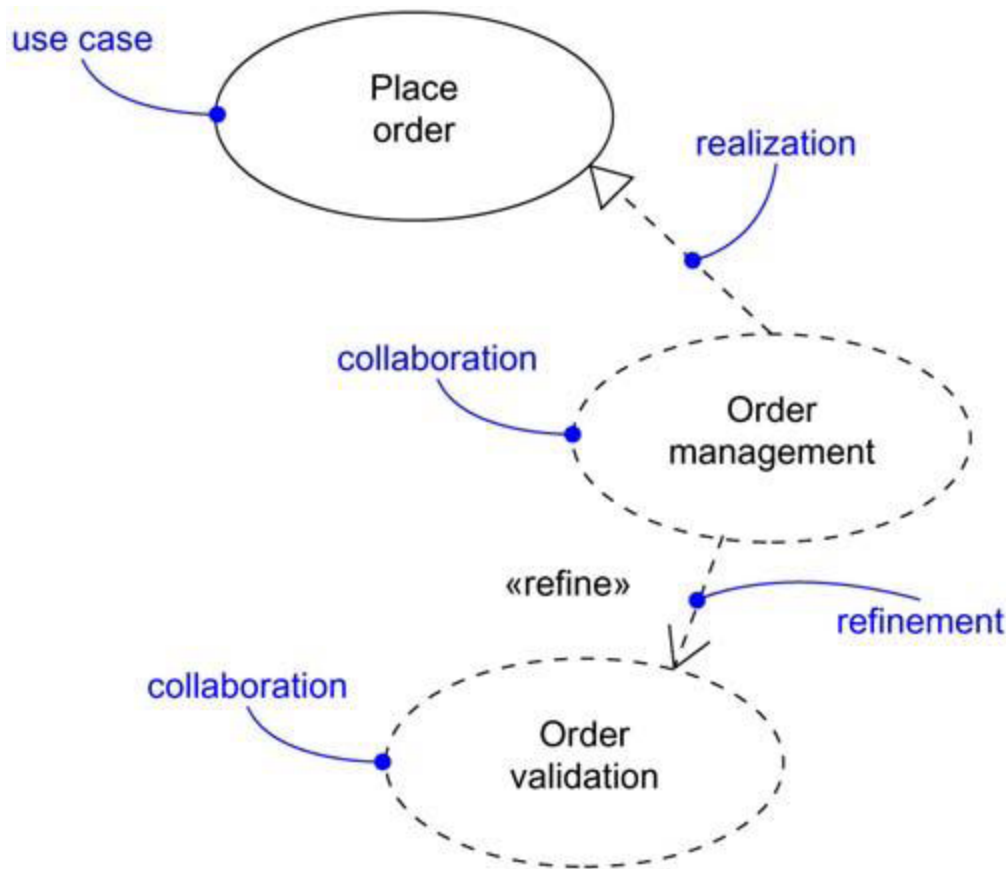


Figure 4: Organizing Collaborations

### Modeling the Realization of a Use Case

To model the realization of a use case,

- Identify those structural elements necessary and sufficient to carry out the semantics of the use case.
- Capture the organization of these structural elements in class diagrams.
- Consider the individual scenarios that represent this use case. Each scenario represents a specific path through the use case.
- Capture the dynamics of these scenarios in interaction diagrams. Use sequence diagrams if you want to emphasize the time ordering of messages. Use collaboration diagrams if you want to emphasize the structural relationships among these objects as they collaborate.
- Organize these structural and behavioral elements as a collaboration that you can connect to the use case via realization.

Figure 5: shows a set of use cases drawn from a credit card validation system

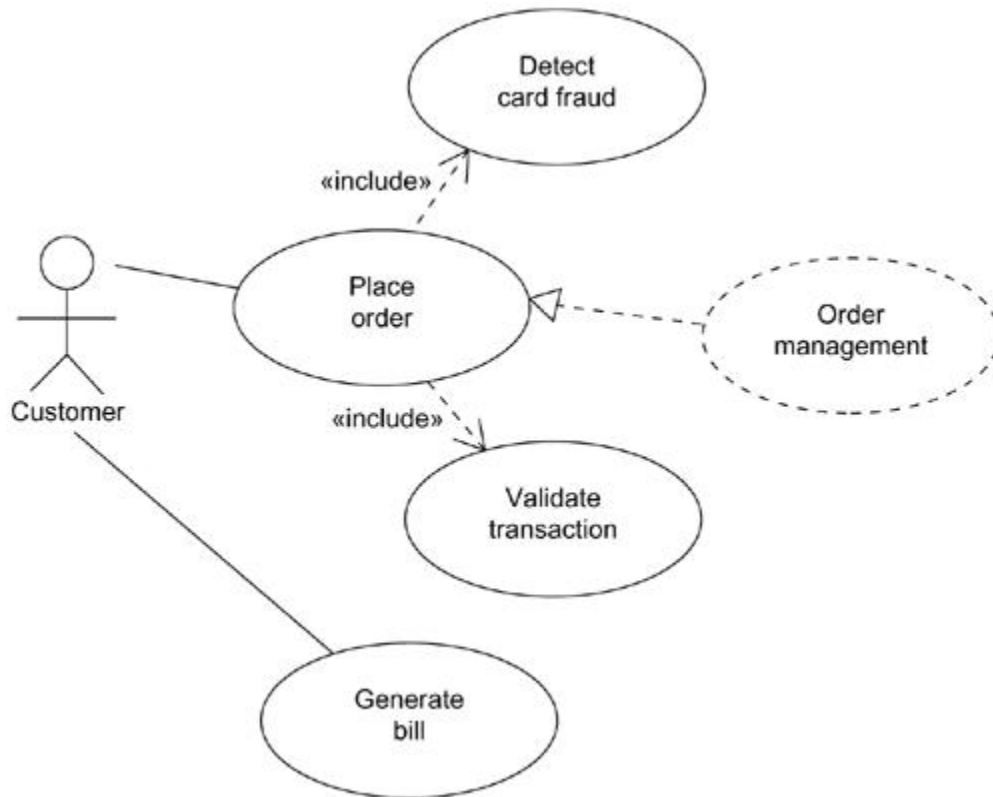


Figure 5: Modeling the Realization of a Use Case

### Modeling the Realization of an Operation

To model the implementation of an operation,

- Identify the parameters, return value, and other objects visible to the operation.
- If the operation is trivial, represent its implementation directly in code, which you can keep in the backplane of your model, or explicitly visualize it in a note.
- If the operation is algorithmically intensive, model its realization using an activity diagram.
- If the operation is complex or otherwise requires some detailed design work, represent its implementation as a collaboration. You can further expand the structural and behavioral parts of this collaboration using class and interaction diagrams, respectively.

Figure 6: shows the active class RenderFrame with three of its operations exposed.

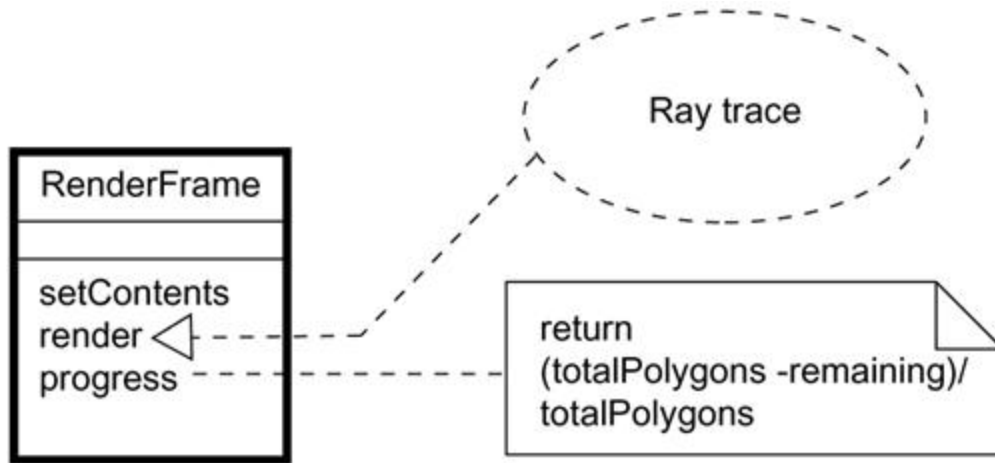


Figure 6: Modeling the Realization of an Operation

Source : <http://praveenthomasln.wordpress.com/2012/04/07/collaborations-s8-cs/>