



Process-Specific Extensions

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The most recent updates on the Unified Modeling Language are available via the worldwide web: *<http://www.rational.com>*.

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1. OBJECTORY STEREOTYPES

The Objectory process originally had its own notation but it has been mapped onto the UML. This section shows the stereotypes that are used in the Objectory process.

1.1 MODEL AND PACKAGE STEREOTYPES

1.1.1 Stereotypes

An Objectory system comprises several different but related models. Objectory models are characterized by the lifecycle stage that they represent. The different models are stereotypes of model:

use case	Model in which the top-most package is a use case system.
analysis	Model in which the top-most package is an analysis system.
design	Model in which the top-most package is a design system.
implementation.	Model containing implementation information, such as code bodies.

The Objectory packages are stereotypes of package:

use case system	The top-most package in a use case model. A use case system contains use case packages and/or use cases and/or actors.
use case package	Package containing use cases and actors with relationships. A use case is not partitioned over several use case packages.
analysis system	The top-most package in an analysis model. An analysis system contains analysis subsystems and/or analysis service packages and/or analysis types and relationships.

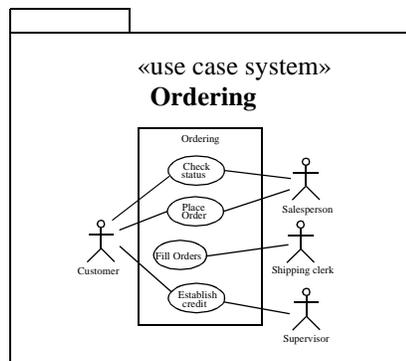
Objectory Stereotypes

analysis subsystem	An analysis subsystem contains analysis subsystems and/or analysis service packages and/or analysis types and relationships.
analysis service package	An analysis service packages contains analysis types and relationships.
design system	The top-most package in a design model. A design system contains design subsystems and/or design service packages and/or design types and relationships.
design subsystem	A design subsystem contains design subsystems and/or design service packages and/or design types and relationships.
design service package	An design service packages contains design types and relationships.

1.1.2 Notation

Package stereotypes are indicated with stereotype keywords in guillemets. There are no stereotyped icons for packages.

Figure 1. Objectory Packages



1.2 TYPE STEREOTYPES

1.2.1 Stereotypes

Analysis types come in the following three kinds:

entity	A type that is passive, that is, it does not initiate interactions on its own. An entity object may participate in many different use case interactions and usually outlives any single interaction.
control	A type that initiates and controls interactions between a society of objects. A control type usually has behavior specific for one use case and a control object usually does not outlive the use case interaction in which it participates.
boundary	A type that lies on the periphery of a system but within it. It interacts with actors outside the system as well as objects of all three analysis types within the system.

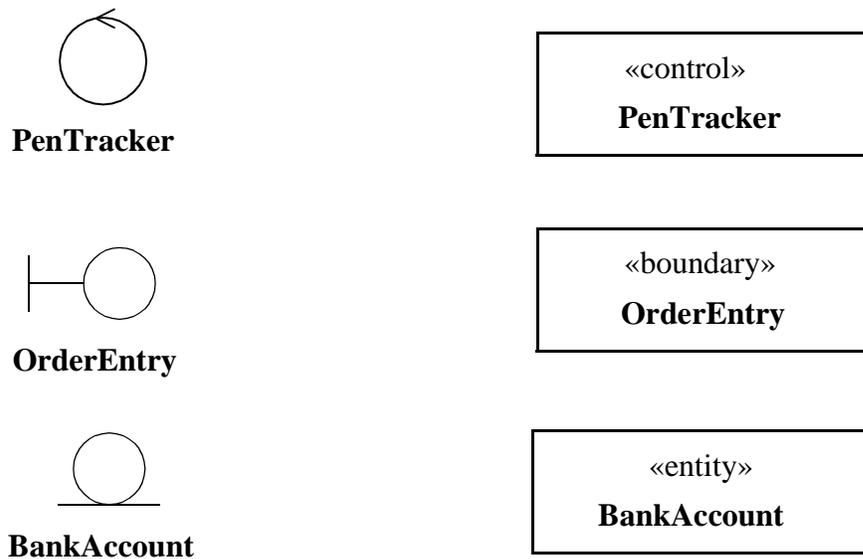
Design types are not stereotyped in the Objectory process.

Objectory Stereotypes

1.2.2 Notation

Type stereotypes can be shown with keywords in guillemets. They can also be shown with the following special icons:

Figure 2. Type stereotypes



1.3 USE CASE RELATIONSHIPS

Use case relationships are described as part of the standard UML notation. They are repeated here for convenience.

1.3.1 Stereotypes

The following relationships are defined on use cases:

Communicates – The communication of an actor with a use case is shown by connecting the actor symbol to the use case symbol by a solid association line. The stereotype «communicates» may be attached to the line but it is unnecessary because it is the only kind of relationships between actors and use cases.

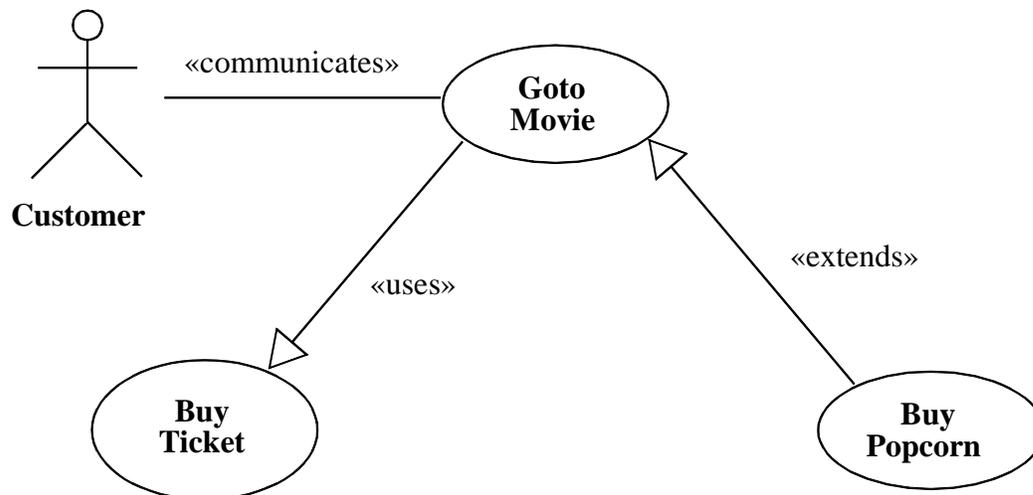
Extends – An “extends” relationship between use cases is shown by a generalization arrow from the use case providing the extension to the base use case. The arrow

is labeled with the stereotype «extends». An extends relationships from use case A to use case B indicates that an instance of use case B may include (subject to specific conditions specified in the extension) the behavior specified by A. Behavior specified by several extenders of a single target use case may occur within a single use case instance.

Uses – A “uses” relationship between use cases is shown by a generalization arrow from the main use case to the use case being used. The arrow is labeled with the stereotype «uses». A uses relationship from use case A to use case B indicates that an instance of the use case A will also include the behavior as specified by B.

1.3.2 Notation

Figure 3. Use case relationships



1.4 ASSOCIATION STEREOTYPES

1.4.1 Stereotypes

The following are special Objectory associations between classes or types:

communicates

An association used by two instances to interact. This may be one-way or two-way navigation. The direction of communication is indicated by the arrow(s).

Objectory Stereotypes

subscribes to	An association indicating an interaction between two types, a subscriber and a target. The subscriber specifies a set of events. The subscriber is notified when one of those events occurs in the target.
extends	An “extends” relationship between types is shown by a generalization arrow from the type providing the extension to the base type. The arrow is labeled with the stereotype «extends». An extends relationships from type A to type B indicates that an object of type B may optionally include (subject to specific conditions specified by the extension) the behavior specified by A. A single type instance may include the behavior of several parallel extensions.

1.4.2 Notation

Association stereotypes are indicated by keywords in guillemets. There are no special stereotype icons.

1.5 CONSTRAINTS ON OBJECTORY MODELS

Stereotyped model elements are subject to certain constraints in addition to the constraints imposed on all elements of their kind.

1.5.1 Generalization

All the modeling elements in a generalization must be of the same stereotype.

1.5.2 Associations

Apart from standard UML combinations the following combinations are allowed for each stereotype:

Table 1: Association stereotype combinations

from\to	actor	boundary	entity	control
actor		communicates		

Table 1: Association stereotype combinations

from\to	actor	boundary	entity	control
boundary	communicates	communicates	communicates subscribes to	communicates
entity			communicates subscribes to	
control		communicates	communicates subscribes to	communicates

2. BUSINESS MODELING STEREOTYPES

This section describes stereotypes that can be used to tailor the use of UML for business modeling. All of the UML concepts can be used for business modeling, but providing business stereotypes for some common situations provides a common terminology for this domain. Note that UML can be used to model different kinds of systems: software systems, hardware systems, and real-world organizations. Business modeling models real-world organizations.

2.1 MODEL AND PACKAGE STEREOTYPES

A business system is represented by use case models and object models. A large business system may be partitioned into subordinate business systems.

2.1.1 Stereotypes

A business system comprises several different but related models. The models are characterized by being exterior or interior to the business system they represent. Exterior models are use case models and interior are design models. The following are the model stereotypes:

use case	Model in which the top-most package is a use case system. These models describe the things exterior to the business system itself.
object	Model in which the top-most package is an object system. These models describe the things interior to the business system itself.

A business system uses the following stereotypes of package:

use case system	The top-most package in a use case model. A use case system contains use case packages and/or use cases and/or actors.
use case package	Package containing use cases and actors with relationships. A use case is not partitioned over several use case packages.
object system	The top-most package in an object model. An object system contains organization units, types, and relationships.

organization unit	Package corresponding to an organization unit of the actual business. An organization unit package contains organization units, types, and relationships.
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2.1.2 Notation

Package stereotypes are indicated with stereotype keywords in guillemets. There are no special stereotyped icons for packages.

2.2 TYPE STEREOTYPES

2.2.1 Stereotypes

Business object types come in the following kinds:

actor	The role of a person outside the business system that interacts directly with the system. This is modeled as an actor in a use case model and not a new stereotype. (It is included in this list for reference only.)
worker	A type that represents an abstraction of a human that acts within the system. A worker interacts with other workers and manipulates entities while participating in instances of use cases.
case worker	A subtype of worker that represents a worker who interacts directly with actors outside the system.
internal worker	A subtype of worker that represents a worker that interacts with other works and entities inside the system.
handler	A term for an actor or a worker. This is not an object type; it is included in this list for reference only.
entity	A type that is passive, that is, it does not initiate interactions on its own. An entity object may participate in many different use case interactions and usually outlives any single interaction. In business modeling entities represent objects that workers access, inspect, manipulate, produce, and so on. Entity

Business Modeling Stereotypes

objects provide the basis for sharing among workers participating in different use cases.

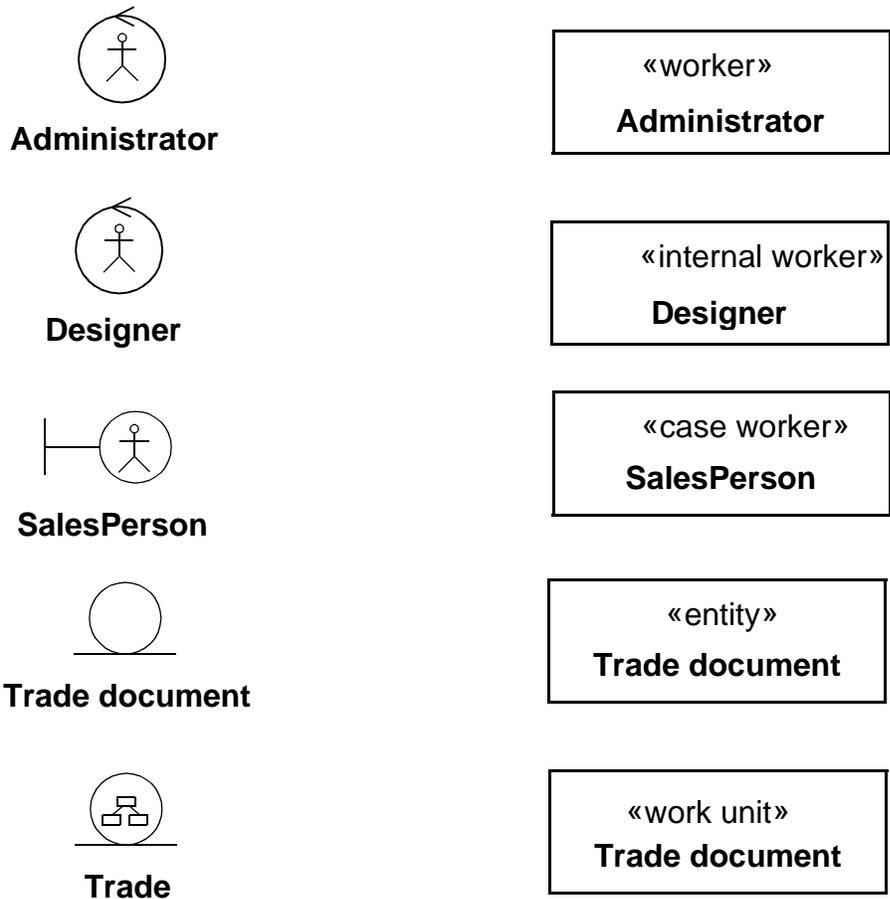
work unit

A shared aggregate with a dominant entity object (marked «dominant») together with the other objects with which it interacts closely. At a higher level the work unit is a single recognizable “whole” to workers in the context of one or more use cases. Work units are exchanged between handlers. The state of the work unit is reflected by the state of its dominant entity which goes through state changes as its work unit is manipulated by handler operations.

2.2.2 Notation

Type stereotypes can be shown with keywords in guillemets within the normal class symbol. They can also be shown with the following special icons:

Figure 4. Type stereotypes



The preceding icons represent common concepts useful in most business models. Tools and users are free to add additional icons to represent more specific concepts. Examples of such icons include icons for documents and actions, as shown in Figure 5.

Figure 5. Special icons for documents and actions



Business Modeling Stereotypes

2.3 ASSOCIATION STEREOTYPES

2.3.1 Stereotypes

The following are special business modeling associations between classes or types:

communicates	An association used by two instances to interact. This may be one-way or two-way navigation. The direction of communication is the same as the arrow(s).
subscribes to	An association indicating an interaction between two types, a subscriber and a target. The subscriber specifies a set of events. The subscriber is notified when one of those events occurs in the target.

2.3.2 Notation

Association stereotypes are indicated by keywords in guillemets. There are no special stereotype icons.

2.4 CONSTRAINTS ON BUSINESS MODELS

Stereotyped model elements are subject to certain constraints in addition to the constraints imposed on all elements of their kind.

2.4.1 Generalization

All the modeling elements in a generalization must be of the same stereotype.

2.4.2 Associations

Apart from standard UML combinations the following combinations are allowed for each stereotype:

Table 2: Association stereotype combinations

from\to	actor	case worker	entity	internal worker
actor		communicates		

Table 2: Association stereotype combinations

from\to	actor	case worker	entity	internal worker
case worker	communicates	communicates	communicates subscribes to	communicates
entity			communicates subscribes to	
internal worker		communicates	communicates subscribes to	communicates

Business Modeling Stereotypes