

the resources in the assembly line diagrams (resources can be information, things, etc.), and should specify how the processes (and their actors) use the assembly line diagrams (via object-to and object-from assembly lines).

## Appendix A: Eriksson-Penker Business Extensions

The Eriksson-Penker Business Extensions are a powerful set of concepts aimed to help you rapidly conduct high-quality business modeling. The extensions comprise views, diagrams, models, constraints, tagged values, and stereotypes.

### Views

The Eriksson-Penker Business Extensions recommend four views for modeling businesses. These views are not diagrams or models; they are four practical and useful perspectives that facilitate the modeling process. A given problem should be iterated until it is fully understood and described. The four views are:

**Business Vision.** Focuses the overall vision, the key concepts, and the goal structures, and points to problems that need to be eliminated.

**Business Process.** Focuses the business processes that represent the activities and value created in the business, and illustrates the process interaction and use of resources in order to achieve the goals and the overall vision.

**Business Structure.** Focuses the resource structures, such as organizational units, products, documents, information, knowledge, and so on.

**Business Behavior.** Focuses the individual behaviors and interactions. Both resources and processes have individual behaviors as well as interactions. Interaction analysis is an important tool when allocating responsibility to resources and processes (theoretically, processes are resources).

### Diagrams and Models

Recall that a model is the idea and that the diagrams are the blueprints. The Eriksson-Penker Business Extensions suggest a set of models and diagrams suitable for business modeling. Most models are expressed with the nine UML standard diagrams, but some of the suggested models are expressed in one kind of diagram, while other models are expressed in a specialized version of one of the diagrams. For example, the Conceptual model, the Resource model, the Information model, and the Organization model are all expressed with class diagrams. The Process diagram and the Assembly Line diagram are both specializations of the Activity diagram; they are not just models expressed in the standard diagrams, they are also specialized diagrams (all according to the UML specification). In contrast, the Vision Statement and the System Topology diagram are two new diagrams that are neither standard nor specialized diagrams. According to the UML standard, new kinds of diagrams can be added, but we have tried not to add more new diagrams than necessary; instead, we have used standard diagrams and specializations of standard diagrams. The diagrams and models included in Eriksson-Penker Business are:

**Vision Statement diagram.** States the overall vision. This diagram is expressed in plan text.

**Conceptual model.** Aims at defining the business key concepts. It is expressed as a class diagram.

**Goal model.** States the business goals, and is used for validation. It is expressed in an object diagram

**Process diagram.** Shows the business processes and their collaboration. It is a specialization of the Activity diagram.

**Assembly Line diagram.** Focuses on the connection between the business processes and the objects involved. This diagram is also the point of connection between the world of business modeling and the world of software engineering. The Assembly Line diagram is a specialization of the Activity diagram.

**Use-Case diagram.** A standard UML diagram that can be used to capture the functional aspects of supporting systems. Note that functionality can also be described in plain text.

**Resource model.** Captures the resources of a business, which can be information or things; the things can be either abstract or concrete. Concrete things include people, machines, and items; abstract things typically are organizational units, departments, and the like. The Resource model is expressed in a class diagram.

**Organization model.** Shows the organizational structures of a business. The Organization model is a special case (specialization) of the Resource model. The Organization model is expressed in class diagrams or, in some cases, object diagrams.

**Information model.** Shows the information in a structured manner to facilitate decisions regarding what information should be organized in which system. The Information model is a special case (specialization) to the Resource model. The Information model is normally expressed in a class diagram, but it can also be expressed in an object diagram.

**Statechart diagram.** This standard UML diagram is used to express the behavior of resources.

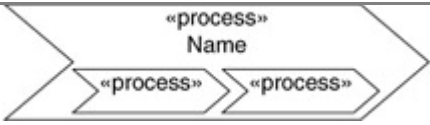

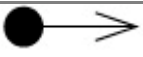
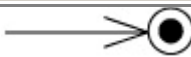


**Interaction diagrams.** Used to conduct interaction analysis. They are Sequence and Collaboration diagrams.

**System Topology diagram.** A new diagram used to specify supporting systems and their dependencies.


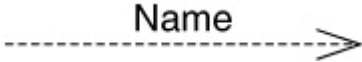
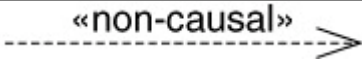
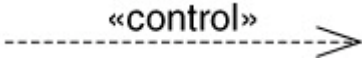
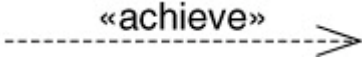
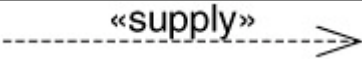




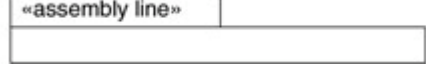
## Stereotypes and Constraints

The Eriksson-Penker Business Extensions provide a set of business model elements called stereotypes that allow you to model and capture the essence of a business. The stereotypes are divided into four categories: process, resource and rules, goals, and miscellaneous. The goal category also contains a small set of constraints, necessary to model the goal hierarchies. [Table A.1](#) itemizes the process extensions, [A.2](#) lists the resources and rules extensions, [A.3.1](#), [A.3.2](#), and [A.3.3](#) contain the goal extensions, and [A.4](#) has the miscellaneous extensions.

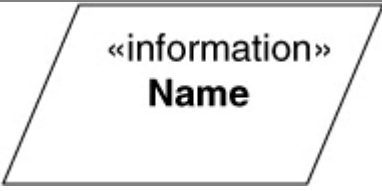
**Table A.1: Process Extensions**

Name	Stereotyped To	Symbol	Definition/Description
Process	Activity		A process is a description of a set of related activities that, when correctly performed, will satisfy an explicit goal.
Activity (atomic process)	Activity		A process might be divided into further processes. If these processes are atomic, they are called activities.
Process start	Start		Starts a process.
Process end	End		Ends a process.
Object-to-Assembly Line	Object		A delivered object from a process to the Assembly Line.
Object-from-Assembly	Object		An object that goes from the Assembly Line to a process.

**Table A.1: Process Extensions**

Name	Stereotyped To	Symbol	Definition/Description
Line			
Process flow	Control Flow		A process control flow with a condition.
Resource flow	Object flow		Object flow shows that an object is produced by one process and consumed by another process.
Noncausal resource flow	Object flow		Noncausal object flow shows that an object might be produced by one process and consumed by another process.
Process control	Object flow		Shows that a process is controlled by an object.
Goal connection	Dependency		Allocates a goal to a process.
Process supply	Object flow		Shows that a process is supplied by an object.
Process decision	Decision		Decision point between two or more processes.
Fork and Join of processes	Fork and Join		Forks and joins processes.
Receive business event	Signal Receipt		Shows a receive business event.
Send business event	Signal Send		Shows a send business event.
Assembly Line	Package		The Assembly Lines synchronize and supply processes in terms of objects.

**Table A.2: Resources and Rules Extensions**

Name	Stereotype To	Symbol	Definition/Description
Information	Class		Information is a kind of resource. It is the knowledge increment brought about by a receiving action in a message transfer; that is, it is the difference between the conceptions interpreted from a received message and the knowledge before the receiving action. [Falkenberg 1996]


**Table A.2: Resources and Rules Extensions**

Name	Stereotype To	Symbol	Definition/Description
Resource	Class	<div>«resource» Name</div>	Resources can be produced, consumed, used, or refined in processes. Resources are either information or things. Things can be abstract or physical.
Abstract resource	Class	<div>«abstract» Name</div>	An abstract resource is an intangible asset, for example, mathematics, concepts, and so on.
People	Class	<div>«people» Name</div>	A physical resource; specifically, human beings.
Physical resource	Class	<div>«physical» Name</div>	A physical resource, excluding people. For example, machines, documents, and so on.
Business event	Signal	<div>«business event» Name</div>	A significant occurrence in time or space. A business event is one that impacts the business.
Business rule	Note	<div>«business rule» Rule statement</div>	Rules restrict, derive, and establish conditions of existence. Business rules are used to specify state of affairs, including allowed business object states.

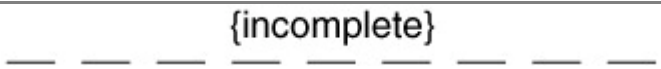
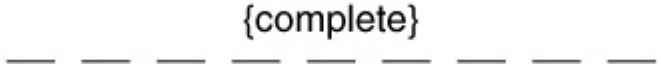
**Table A.3.1: Goal Extensions**

Name	Stereotype To	Symbol	Definition/Description
Goal	Class	<div>«goal» Name</div>	Denote desired states, meaning that goals motivate actions leading to state changes in a desired direction.
Problem	Note	<div>«problem» Problem name</div>	Something that prevents us from meeting goals. Cause, measure, and prerequisite are other stereotype notes that are useful when modeling problems. A cause leads to problems; a problem can be solved if the cause is removed. The cause can be removed if a certain measure is taken and certain

**Table A.3.1: Goal Extensions**

Name	Stereotype To	Symbol	Definition/Description
			prerequisites are valid.
Goal dependency	Dependency		Goals are organized in dependency hierarchies, in which one or several goals are dependent on subgoals.
Contradictory goal	Association	<u>«contradictory»</u>	Goals can be contradictory, but must be fulfilled.

**Table A.3.2: Goal Extensions**

Name	Constraint To	Symbol	Definition/Description
Incomplete goal decomposition	Dependency		Goals can be organized in dependency hierarchies, in which one or several goals are dependent on subgoals.
Complete goal decomposition	Dependency		Goals can be organized in dependency hierarchies, in which one or several goals are dependent on subgoals.

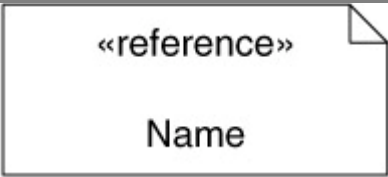
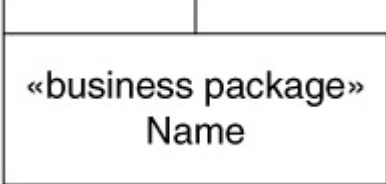
**Table A.3.3: Goal Extensions**

Name	Instance of	Symbol	Definition/Description
Quantitative goal	Goal	<div>«goal»</div> <div><b>Quantitative Goal</b></div> <div>           Goal_Description : String            Goal_Value : String            Current_Value : String            Unit_of_measurement : String         </div>	A goal that can be described with a target value in a specific unit of a measurement (a quantity).
Qualitative goal	Goal	<div>«goal»</div> <div><b>Qualitative Goal</b></div> <div>Goal_Description : String</div>	A goal normally described in a natural language. A qualitative goal involves human judgment, in the process of determining whether it has been fulfilled.
Instance of a qualitative	Qualitative goal	<div><b>Many Customers :</b></div> <div><b><u>Quantitative Goal</u></b></div> <div>           Goal_Value = 500000            Current_Value = 0            Unit_of_measurement = "registrered customers"         </div>	Both qualitative and quantitative goals can be instantiated.

**Table A.4: Miscellaneous Extensions**

Name	Stereotype To	Symbol	Definition/Description
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**Table A.4: Miscellaneous Extensions**

Name	Stereotype To	Symbol	Definition/Description
Reference note	Note		A stereotyped note that contains a reference to another diagram or another document.
Business package	Package		Used to package business models or parts of business models.

## Tagged Values

UML defines and includes many useful tagged values, but the Eriksson-Penker Business Extensions offer a set of new tagged values for describing business processes. They are:

**Goal.** A textual value that describes the goal of the process if a goal object is not explicitly attached to it. The goal, which is a part of the goal model, is used to control, measure, and decide the created value of the process.

**Purpose.** A textual value that informally describes the purpose of the process; for example, anticipated effect. The purpose is typically communicated to the process actors and to customers.

**Documentation.** A textual value that informally describes the work of the process; for example, the activities completed and the resources involved.

**Process owner.** A textual value that defines the person in the organization who has the overall responsibility for the process in question and who manages the changes and plans for changes.

**Process actors.** A textual value that defines the actors needed to run the process. Typically, their skill levels are described.

**Priority.** A textual value that describes the priority of this process; for example, whether it's a core process, a support process, an administrative process, and so on.

**Risks.** A textual value that describes the risk of the process; for example, what can go wrong either when executing the process in question or when implementing it to the business.

**Possibilities.** A textual value that describes the potential of a given process; for example, the opportunities for improving or using the process in the future.

**Time.** A numerical value that approximates the execution duration of the process.

**Cost.** A numerical value that approximates the cost of executing the process.

## Appendix B: Business Patterns Summary

### Resource and Rules Patterns

Pattern Name	Intent	Related Patterns	Page
Actor-Role	Provides guidelines for using actor and role	<ul style="list-style-type: none"> <li>• Organization and</li> <li>• Party Employers</li> </ul>	<a href="#">191</a>