Architetture Software a Microservizi

Corso di Laurea Magistrale in Informatica

Business processes

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Course rationale (reprise)

- Building software systems is complex
- Building large software systems is more complex
- Building large software system integrating functions provided by multiple organizations is even more complex

Managing complexity

How do we face complexity?

- Abstractions
- Models

Abstraction

- The process of formulating generalized ideas or concepts by extracting common qualities from specific examples
- *...the entire history of software engineering is one of rising levels of abstraction (for abstraction is the primary way we as humans deal with complexity)* [G. Booch]

Model

A representation of the system under analysis that answers as the system does for a given set of questions [a *viewpoint*]

Model

Our key ingredients

In this course we will learn how to manage the complexities of large distributed system (and the organizations they support) using two main abstractions:

- Services
- Processes

Services and processes

- **Services** are the **structural** ...
- **Processes** are the **behavioral** ...
- … cornerstones around which we design our systems
- Services expose functions (potentially realized by processes)
- Processes implement services (potentially using other services)

A few definitions

- Business Process
- Business Process Management
- Workflow
- Business Process Management System
- Business Process Model

Business process

A business process consists of a **set of activities** that are performed in **coordination** in an organizational and technical environment.

These activities jointly realize a business **goal**.

Each business process is enacted by a single organization, but it may interact with business processes performed by other organizations.

Business process (alt.)

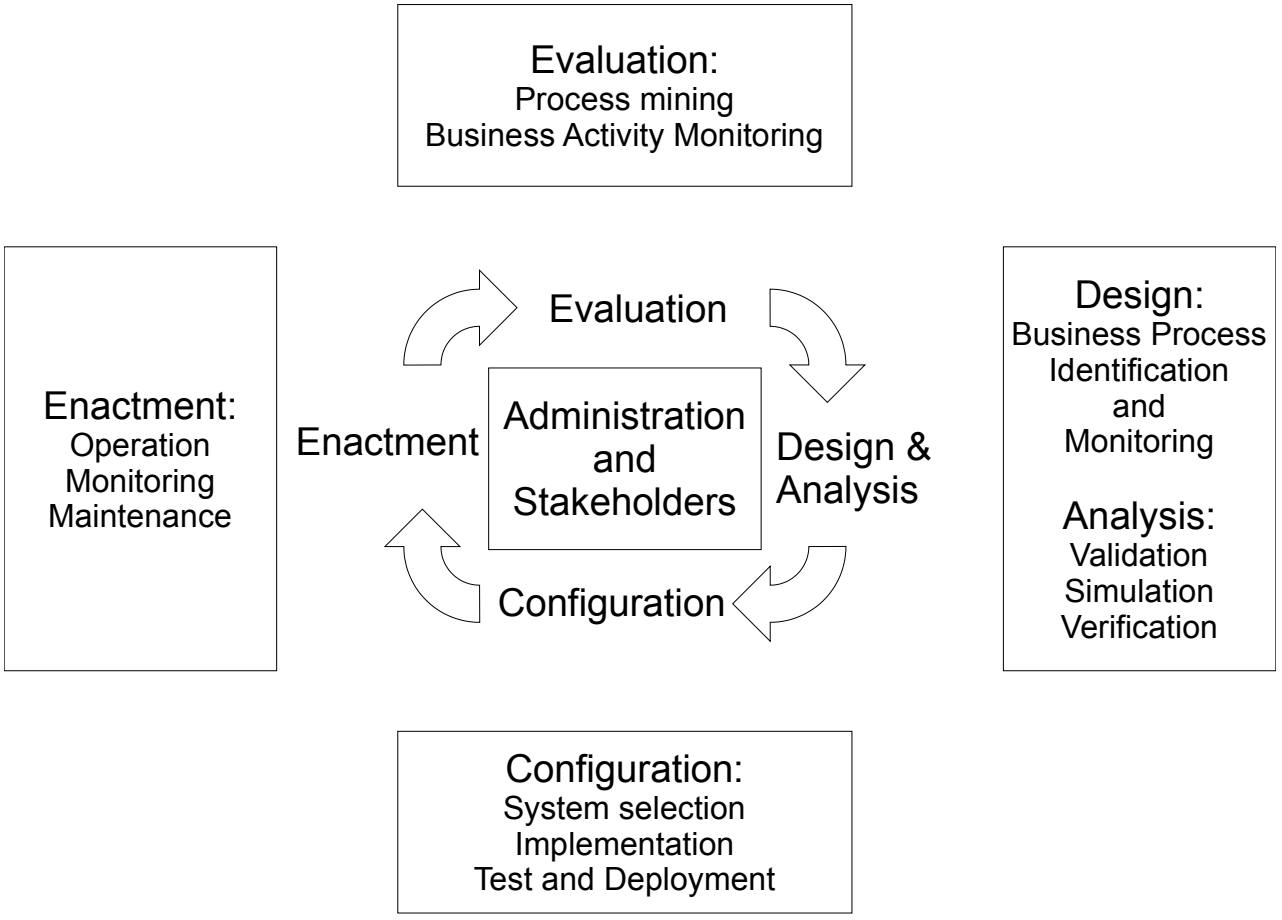
A Process is a set of interrelated or interacting activities, which transforms inputs into outputs [ISO9000].

A Business Process is a process in which the output is either a product or service that is of value to a customer or client.

Business Process Management

Business process management includes concepts, methods, and techniques to support the design, administration, configuration, enactment, and analysis of business processes.

Business Process Lifecycle



Workflow

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.

[WfMC]

Workflow management system

A workflow management system is a software system that defines, creates, and manages the execution of workflows through the use of software, running on one or more workflow engines, which is able to interpret the process definition, interact with workflow participants, and, where required, invoke the use of IT tools and applications

[WfMC]

Business Process Management System

A business process management system is a generic software system that is driven by explicit process representations to coordinate the enactment of business processes.

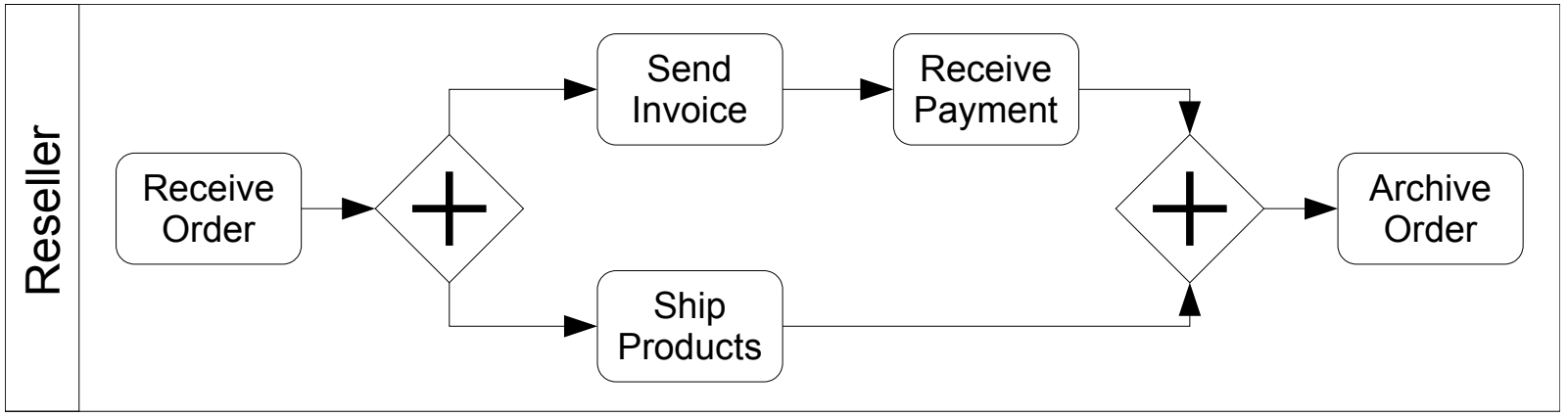
Business Process Model

A **business process model** consists of a set of activity models and execution constraints between them.

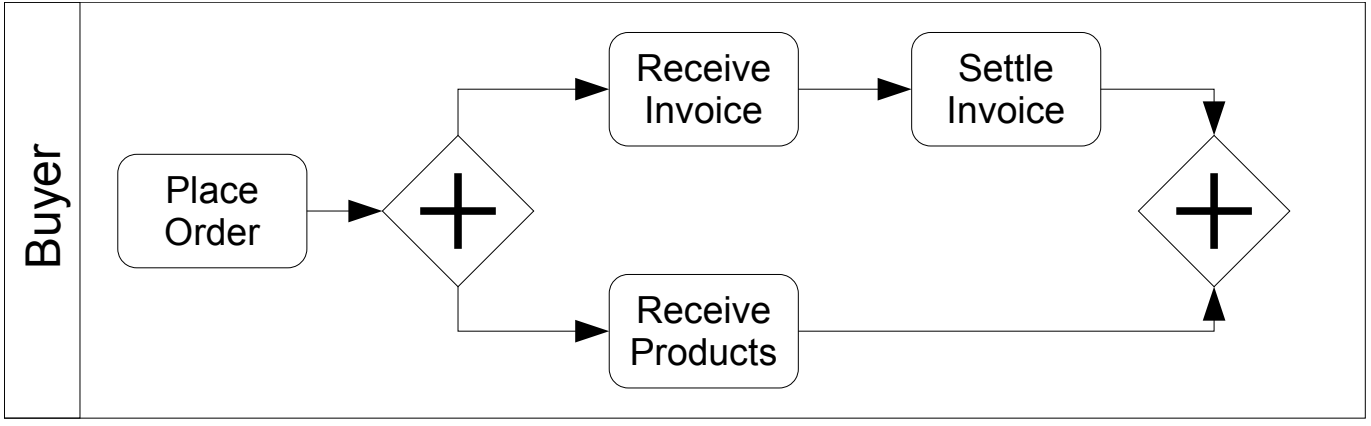
A **business process instance** represents a concrete case in the operational business of a company, consisting of activity instances.

Each business process model acts as a blueprint for a set of business process instances, and each activity model acts as a blueprint for a set of activity instances.

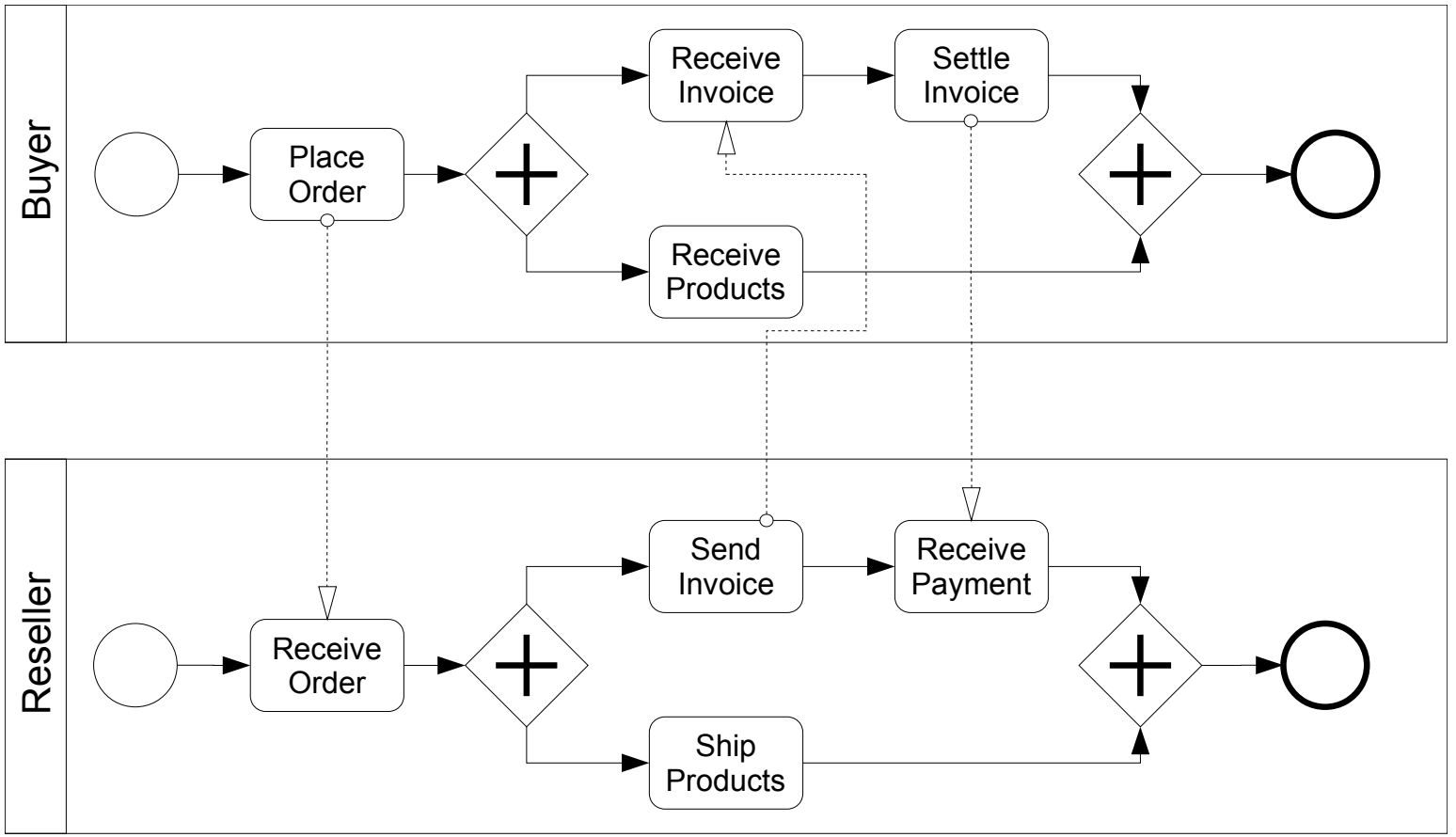
A Business Process Model



A Buyer Process Model

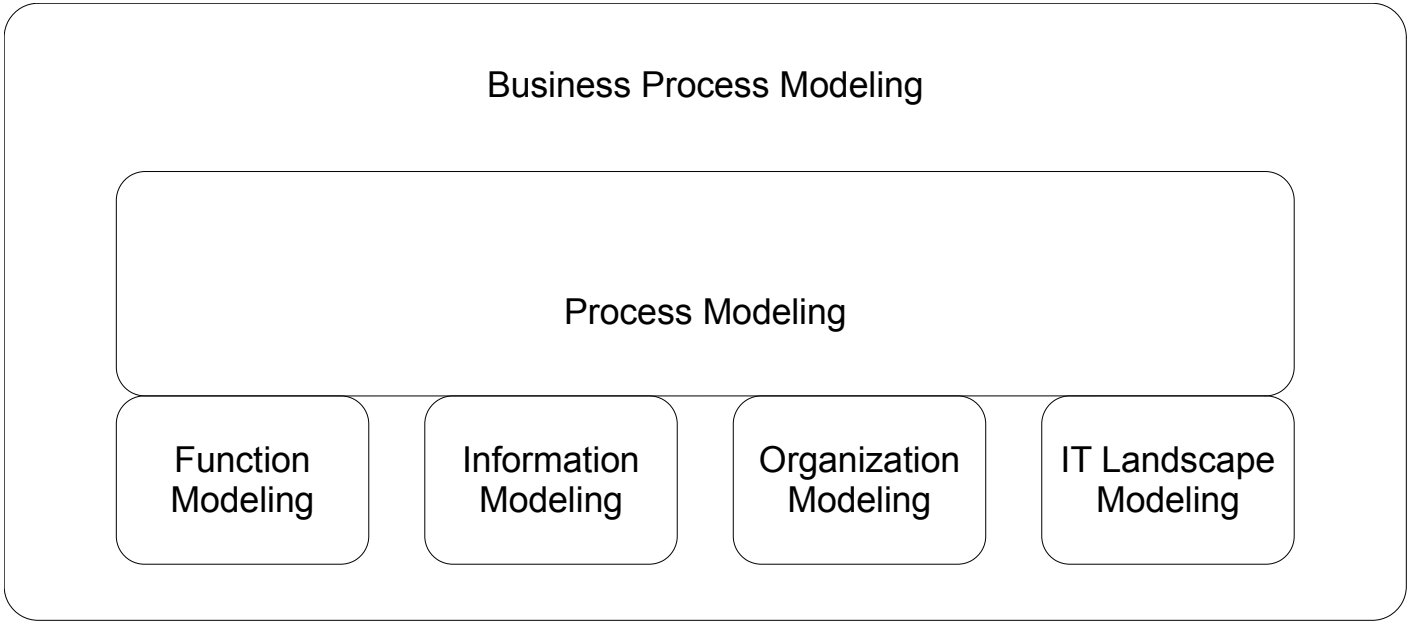


A choreography



BP modeling domains

Business process modeling includes multiple modeling domains, integrated by process modeling



Model-based software engineering

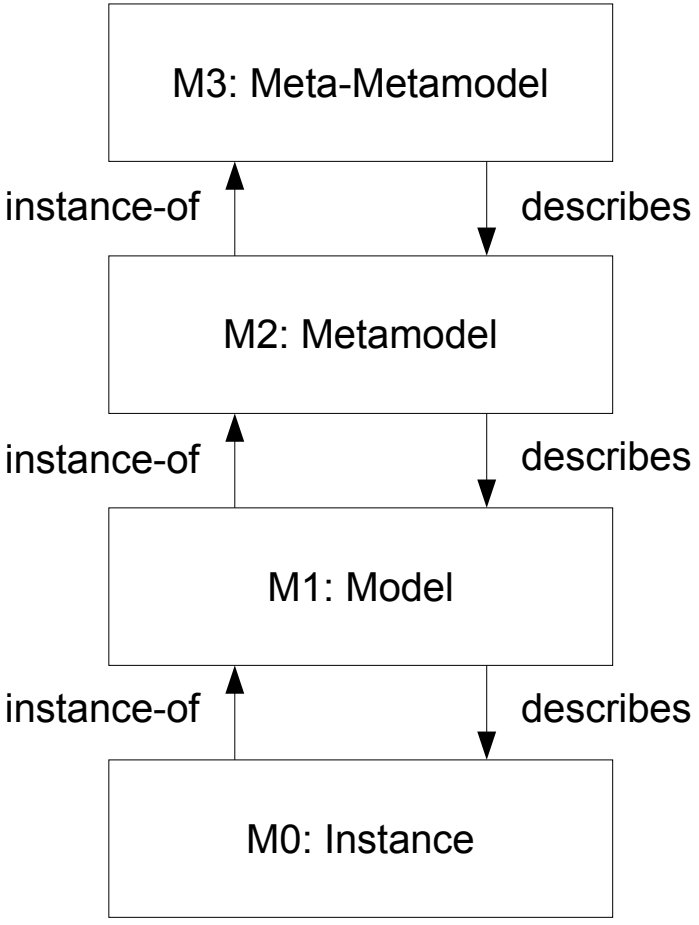
First-class models have implications:

- What's in the model?
- How do you reason on a model?
- Is there a model of the model?

MOF

- UML is defined on top of an OMG modeling standard called MOF (Meta-Object Facility).
- MOF is structured in 4 levels: M0, M1, M2, M3.
- MOF-based languages (such as UML and BPMN) can be serialized as defined by the XMI (XML Metadata Interchange) standard.

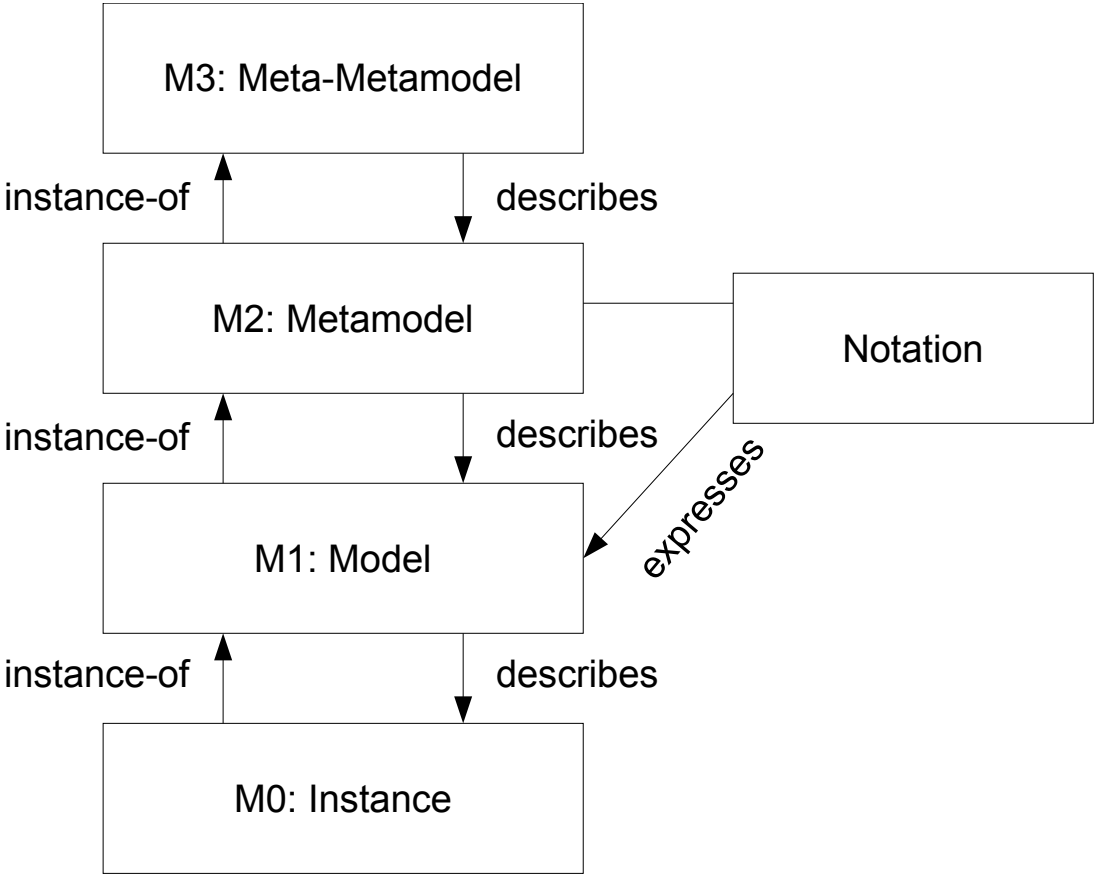
MOF


M3: Meta-Metamodel
instance-of
describes
M2: Metamodel
instance-of
describes
M1: Model
instance-of
describes
M0: Instance

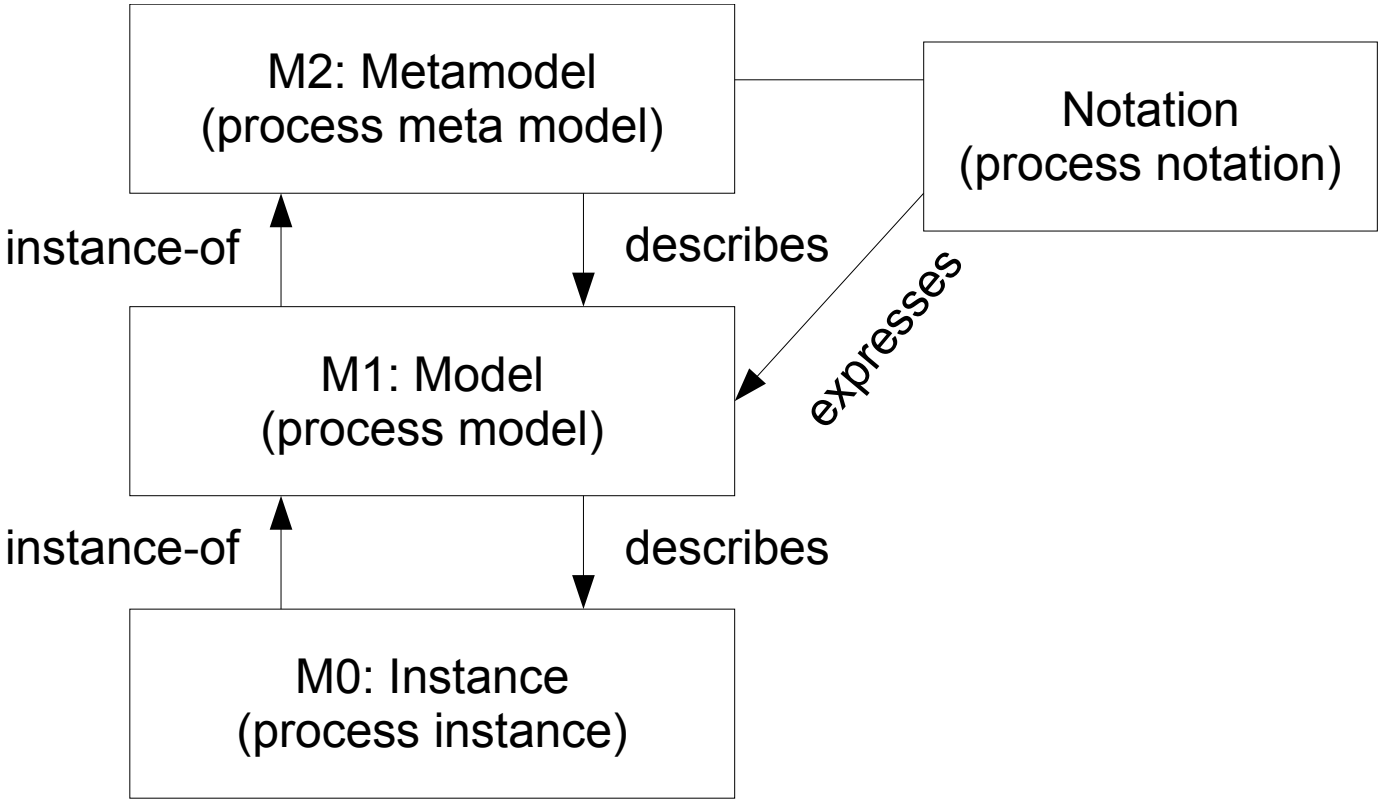
Models and notations

- Models are conceptual entities
- A representation of a model (be that textual or graphical) is not the model itself, is one of the many possible ways to express a model

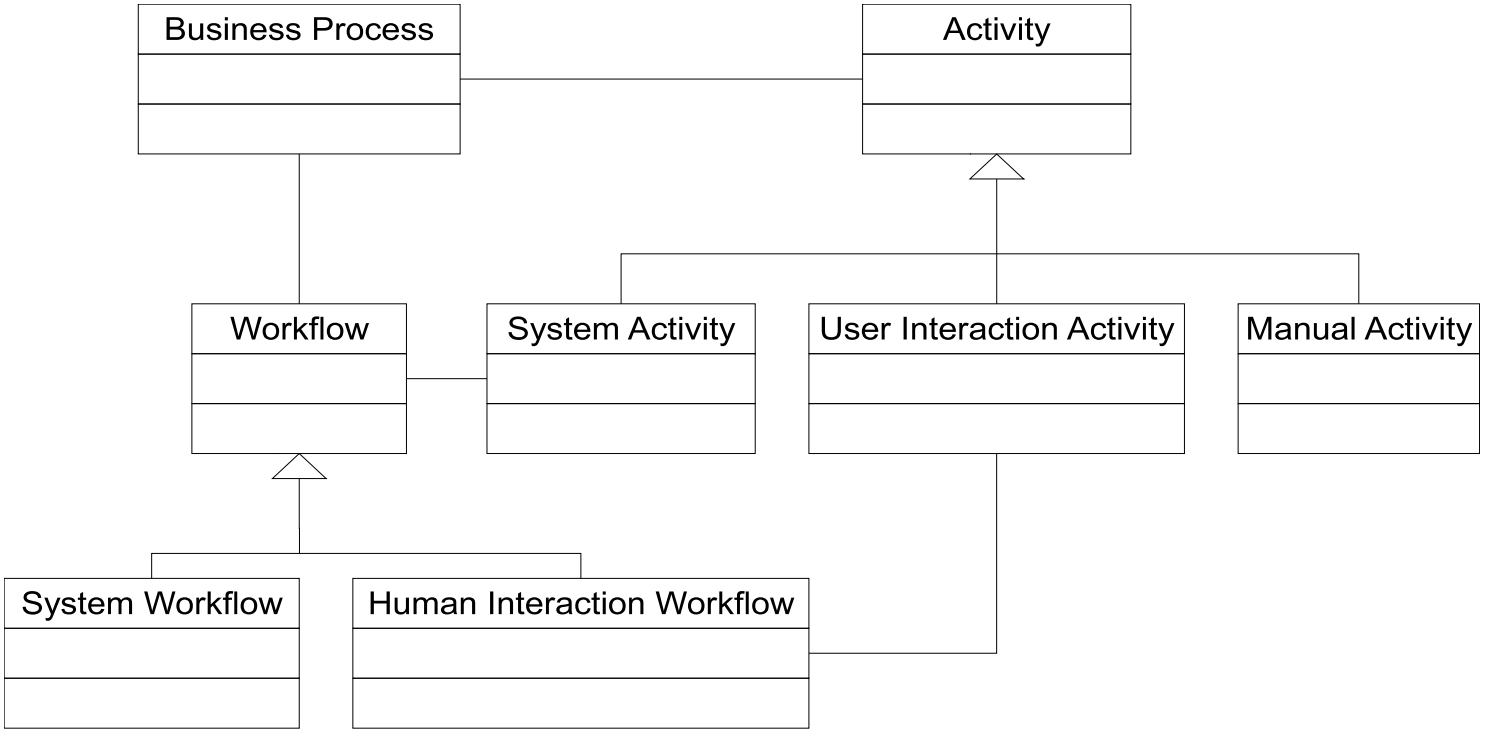
MOF: models and notations



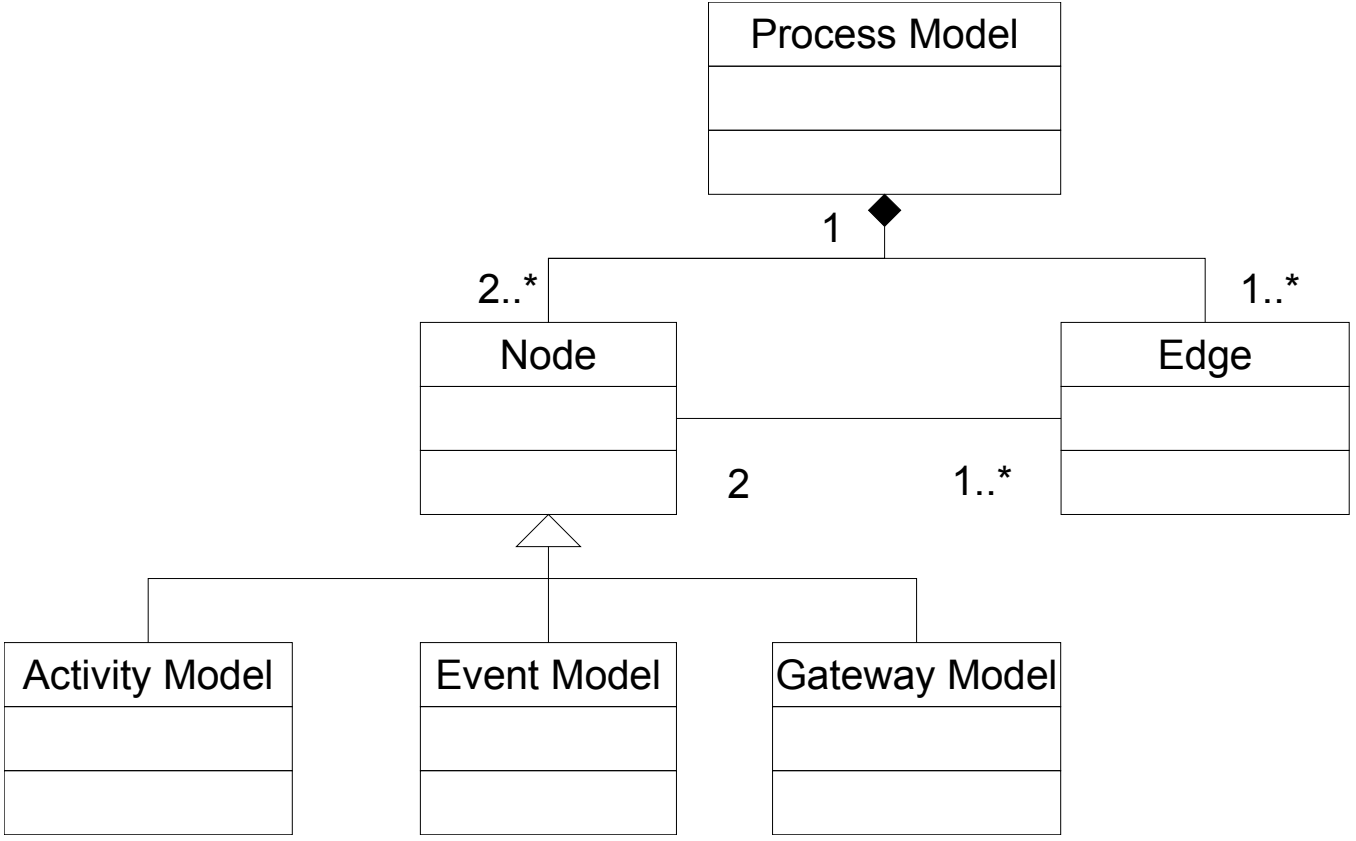
Process aspects



BP conceptual model

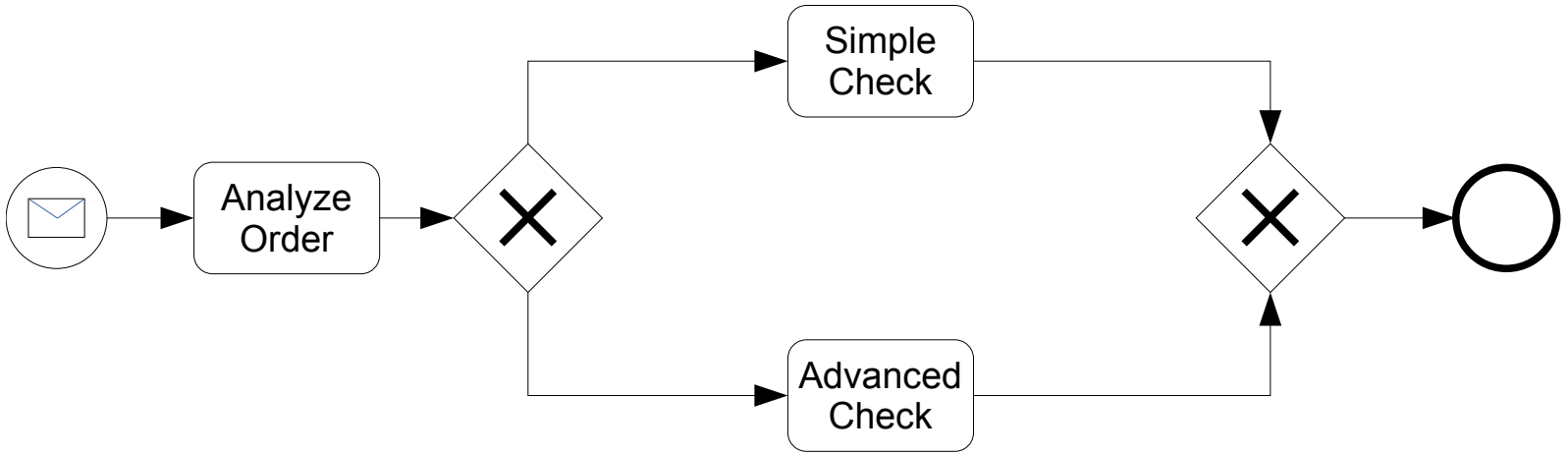


Process metamodel

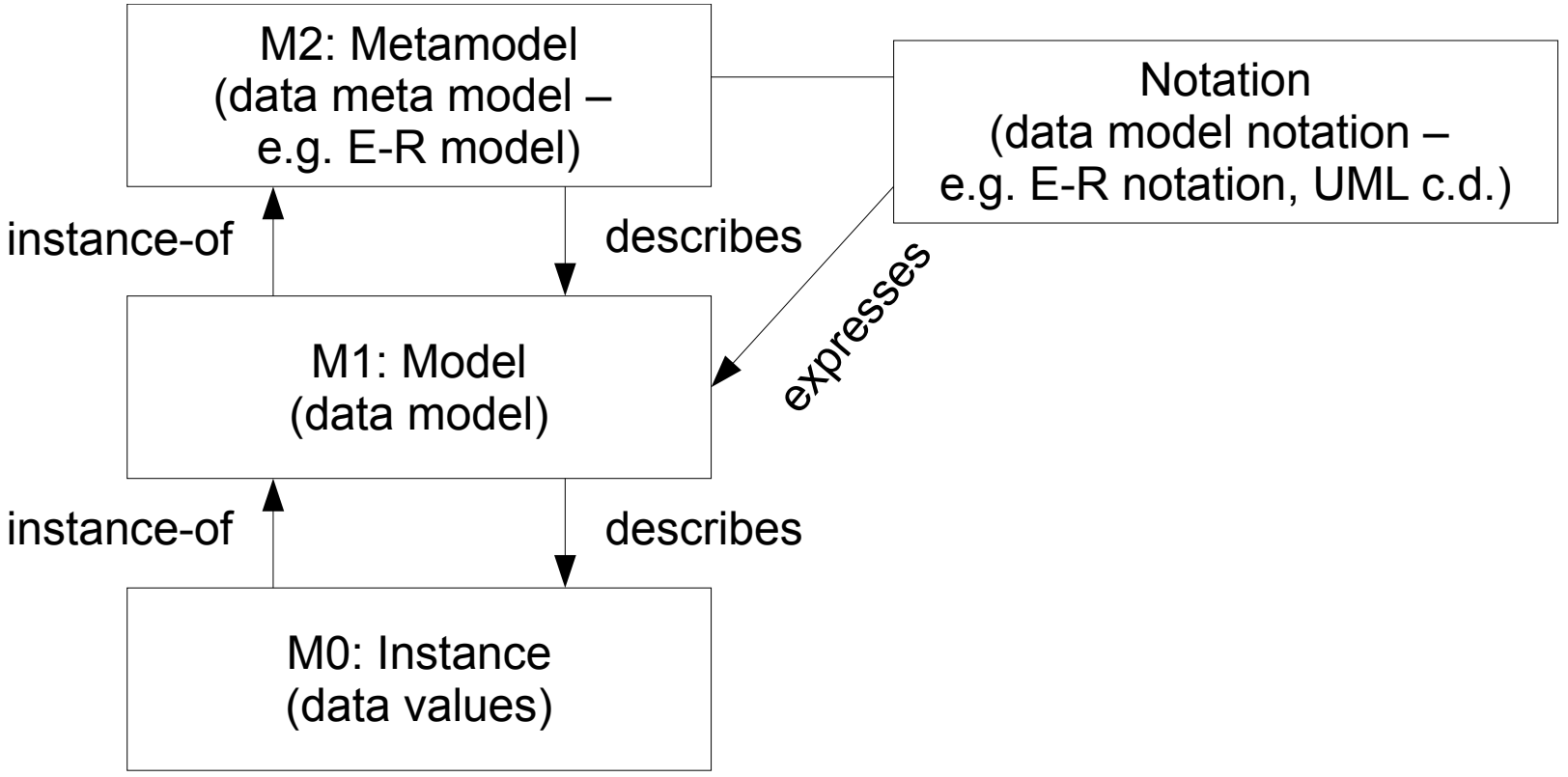


Process notation

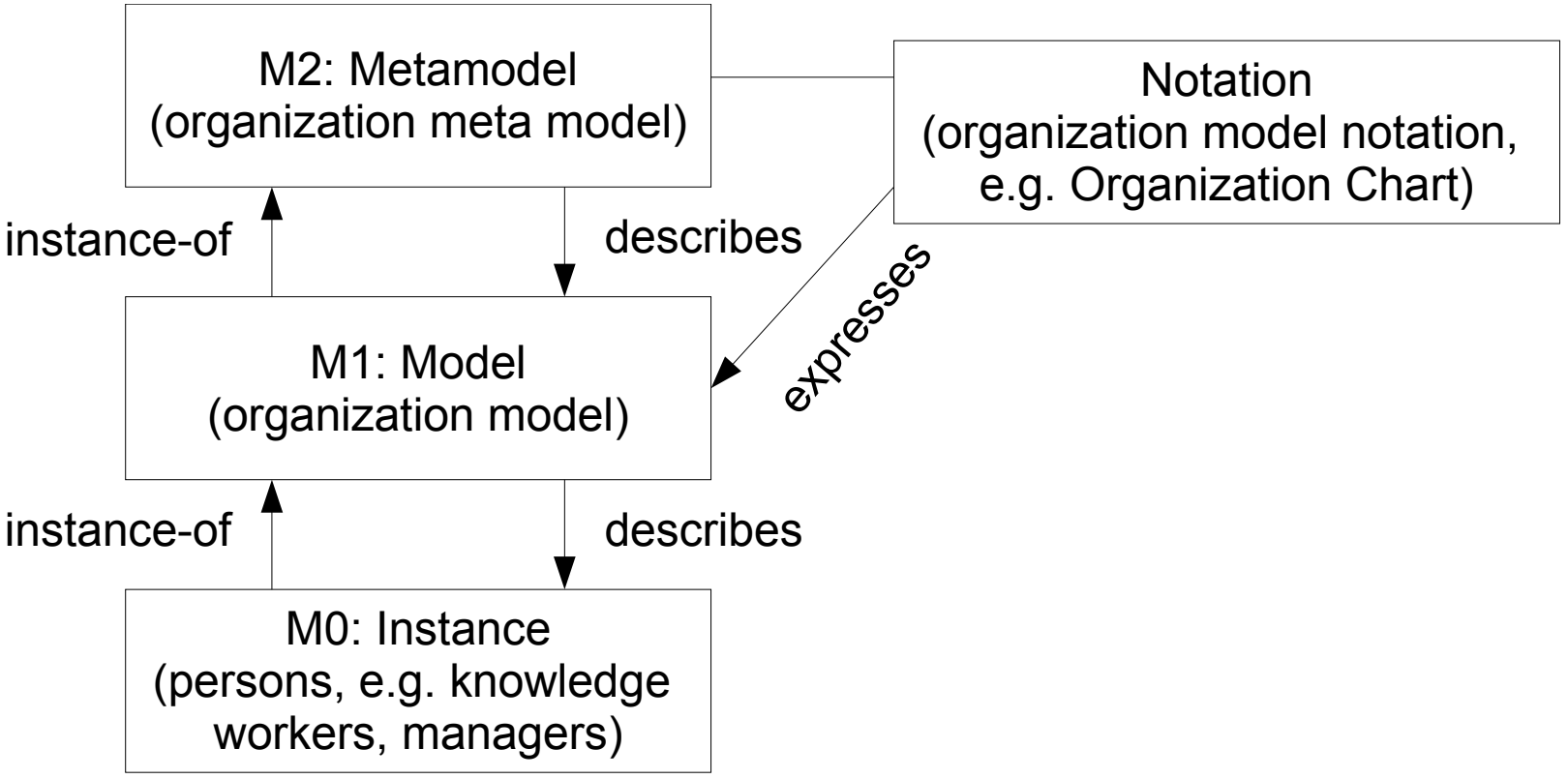
Process notation used to express concepts from process meta model



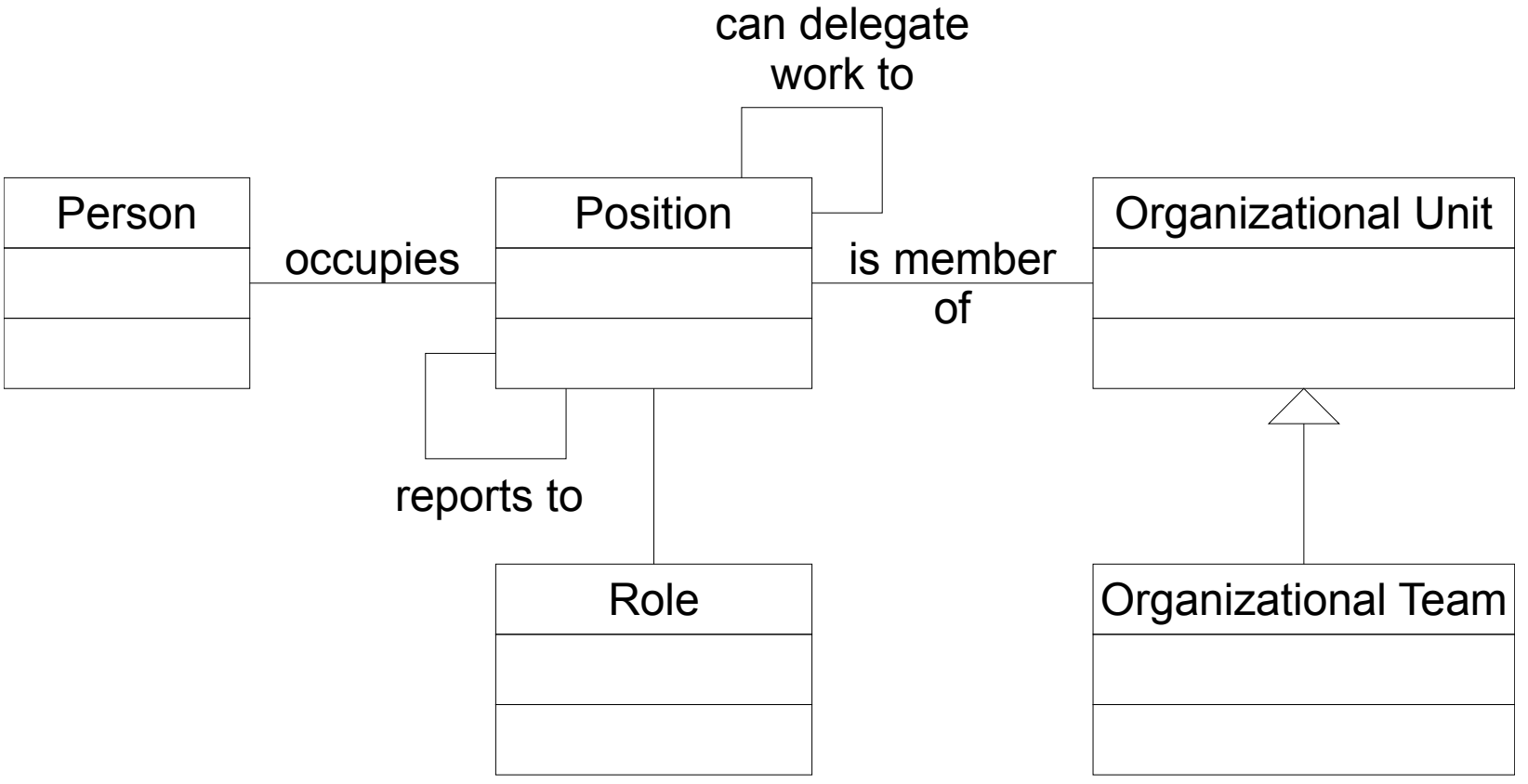
Modeling data



Modeling organizations



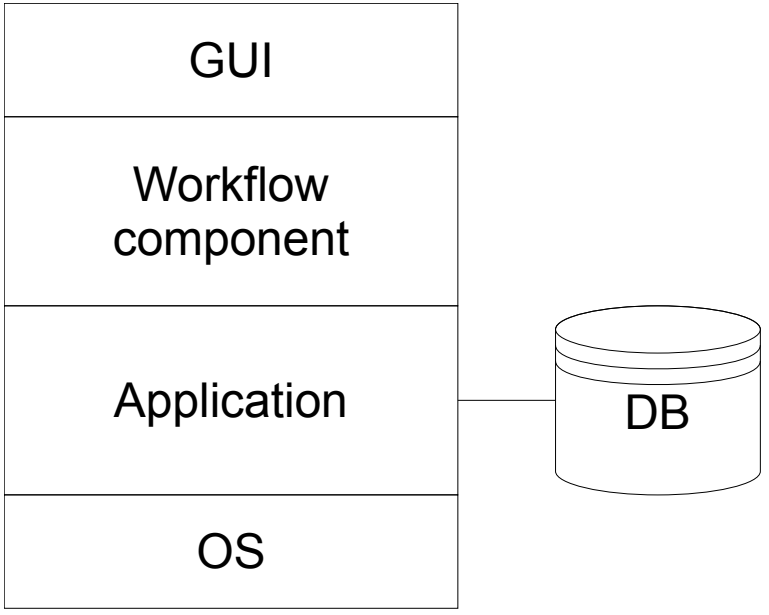
Organization metamodel



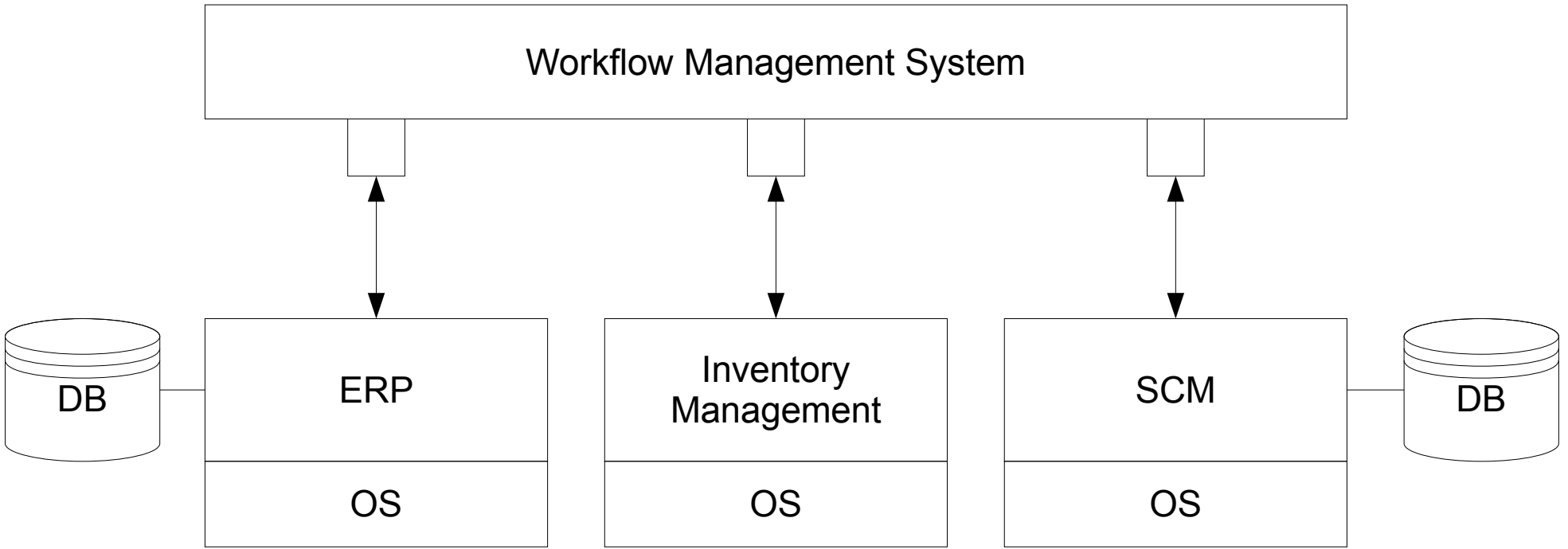
Workflow and applications

Workflow management technologies can be used to implement the business logic within a single application or can be used to coordinate business processes containing activities that are realized by multiple application systems.

Single-application workflow system



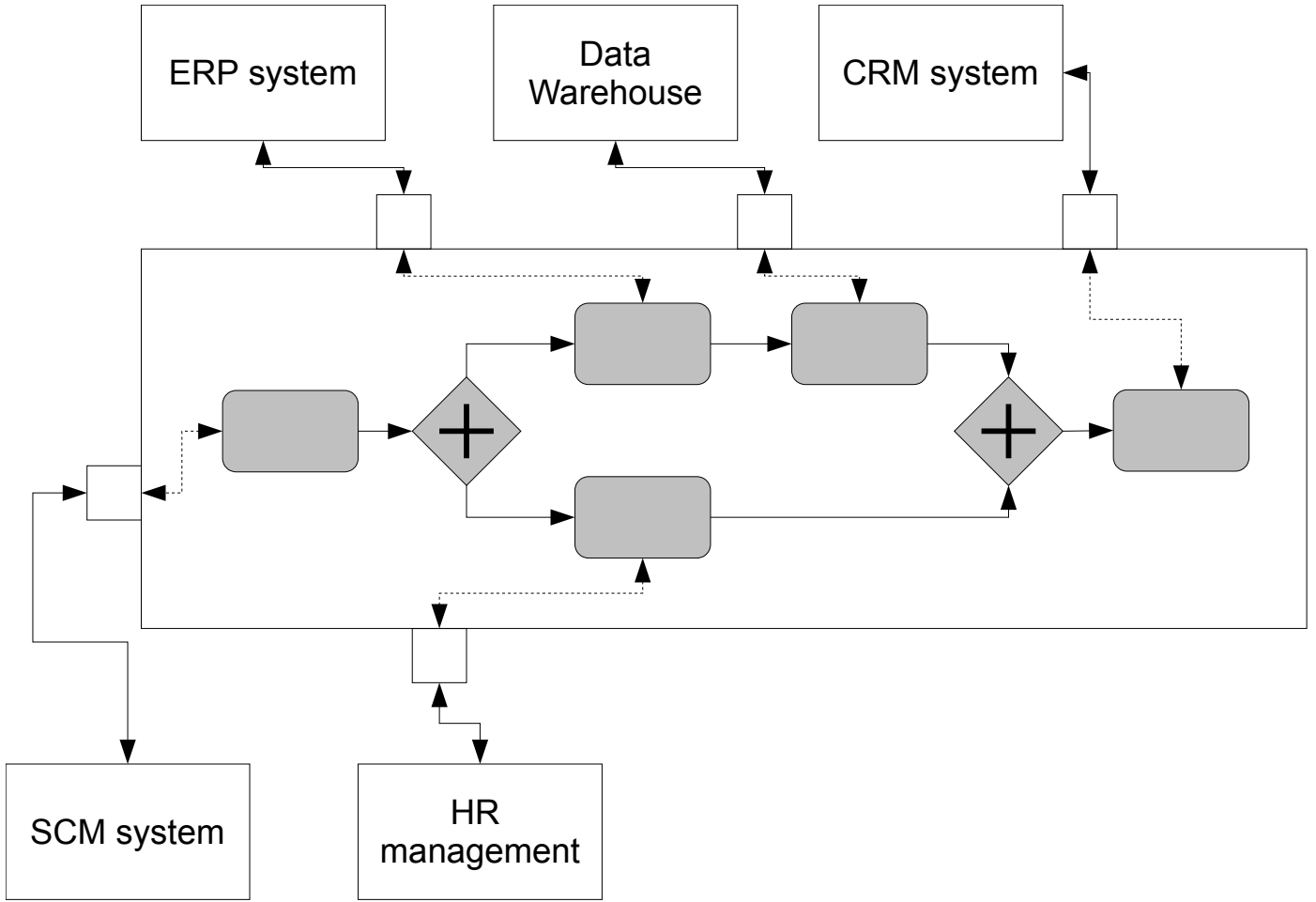
Multiple-application workflow system



System workflows

A **system workflow** consists of activities that are implemented by software systems without any user involvement (see also: services orchestration)

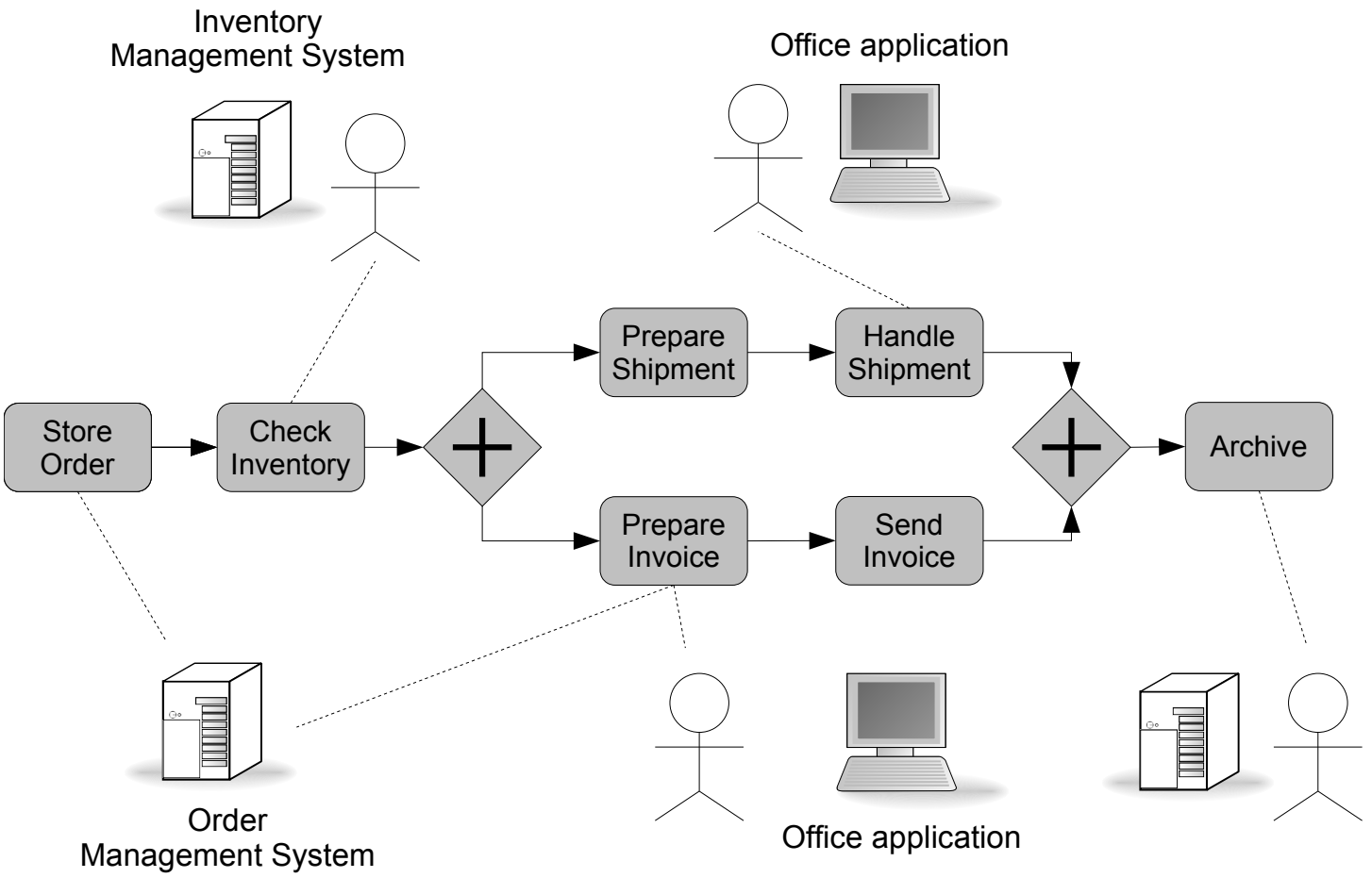
System workflow (orchestration)



Human interaction workflows

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

Human interaction workflow

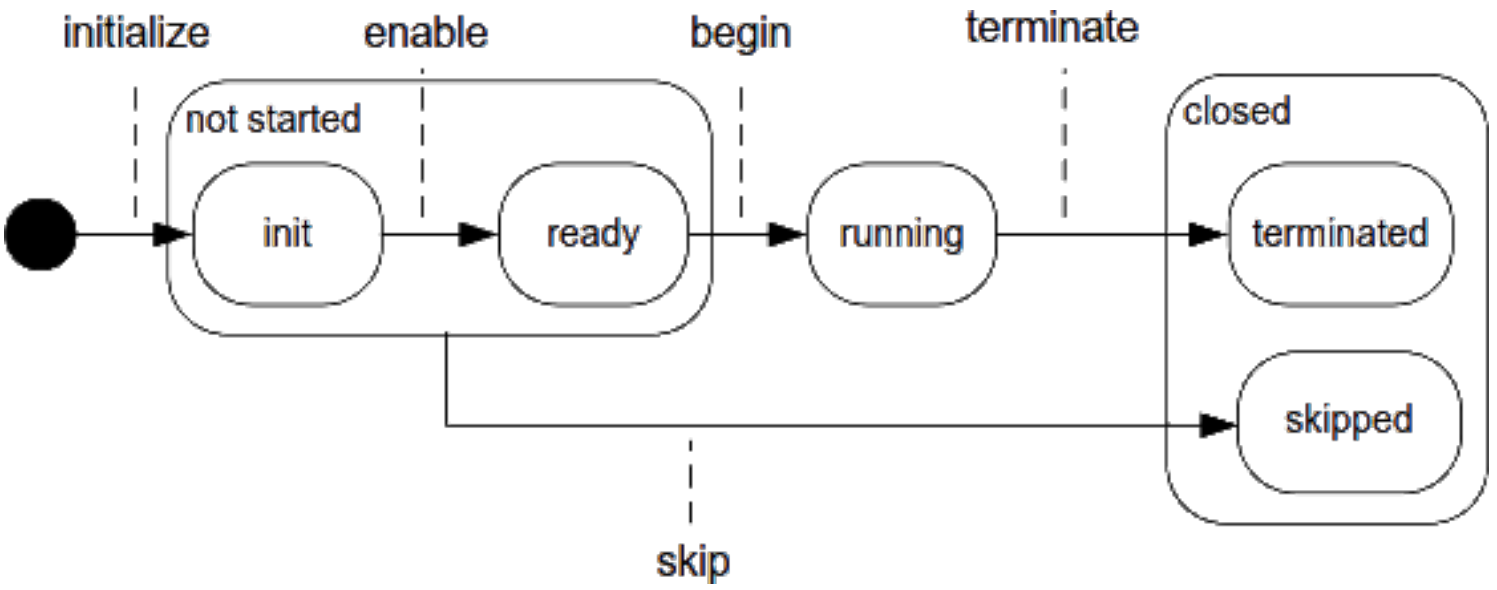


Work items

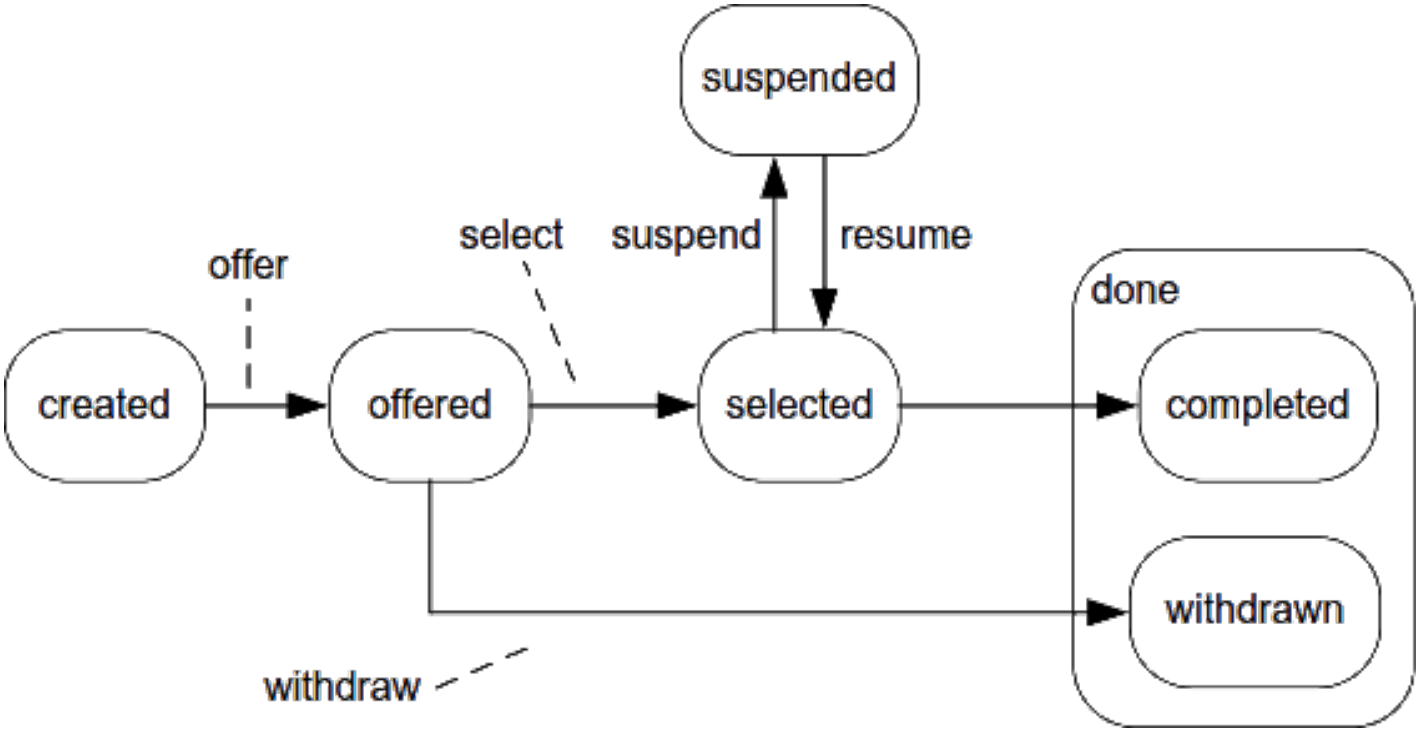
Human interaction workflows require particular graphical user interface concepts. The main concept is the work item list. Knowledge workers interact with the system using work item lists, which are also called in-baskets.

Whenever knowledge workers are required to perform a process activity, they are informed by an item in their work item list.

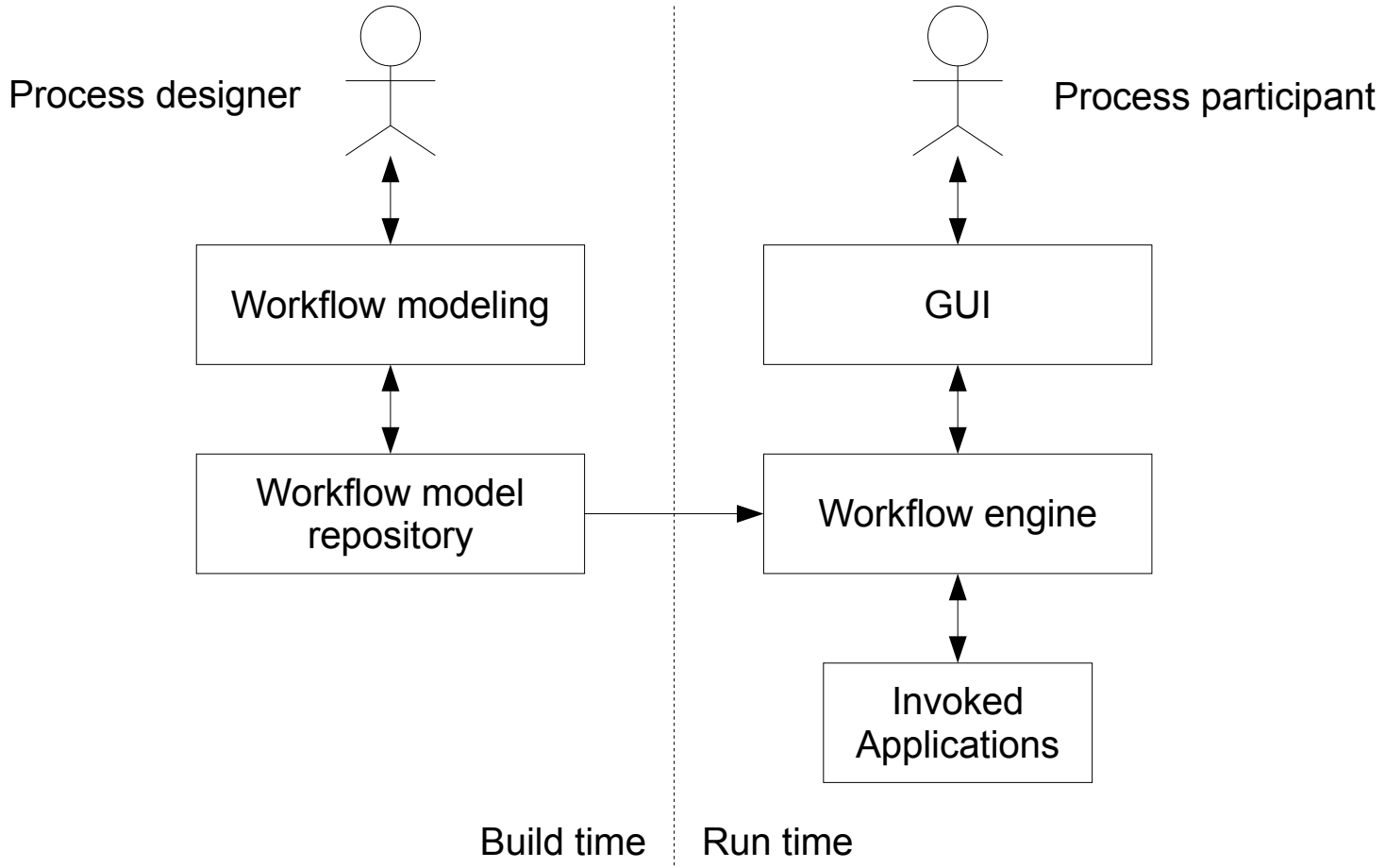
States of activity instances



States of work items



Workflow management architectures



Workflow perspectives

Workflows have to interact with several different aspects of an organization.

These aspects are usually called perspectives:

- Process (or control flow or behavioral)
- Organizational (or resources)
- Functional (or task)
- Informational (or data)