



Rule-enabled Process Modeling

Conrad Bock
**U.S. National Institute of Standards
and Technology**
December 10, 2007

Rules and Processes

- **Goals:**
 - Check whether process definitions are consistent with rules *before* the deploying processes to the business.
 - Check whether currently performing / executing / enacted processes are following the rules (monitoring).
- **Need a process modeling semantics compatible with rules.**

Overview

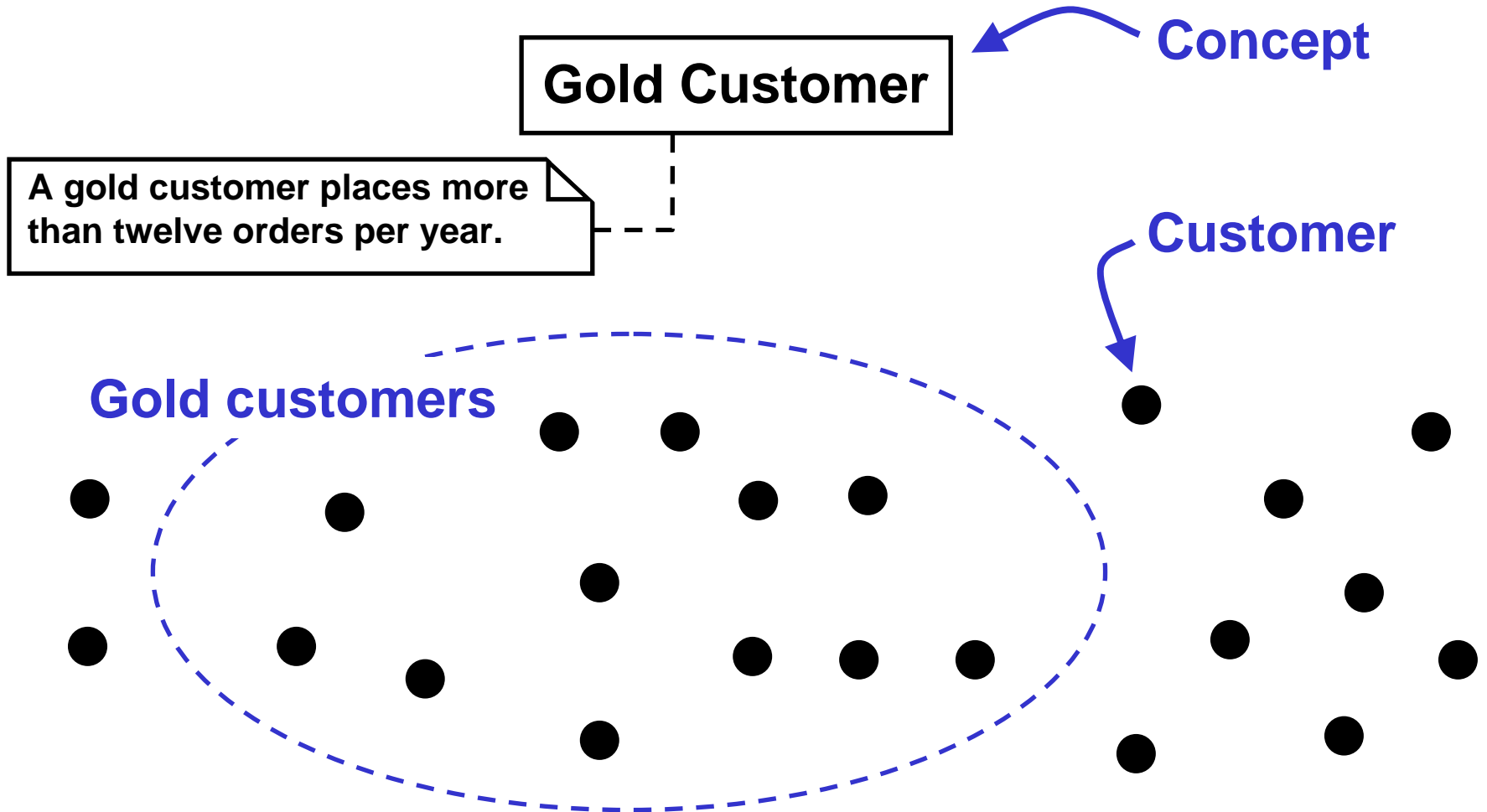
- **Models and rules: Examples from structure models and rules.**
- **Extend to process models:**
 - Operative (execution) rules
 - Process models = operative rules.
 - Consistency of process models and rules.
- **Process modeling that includes operation (execution).**

Structural Rules

- **(Most) Structural rules provide criteria for when something is or is not an instance of a concept.***
- **Example: Gold customers place more than twelve orders per year.**

* Ross, R., Business Rule Concepts, 2005. SBVR has a broader definition.

Structural Rules

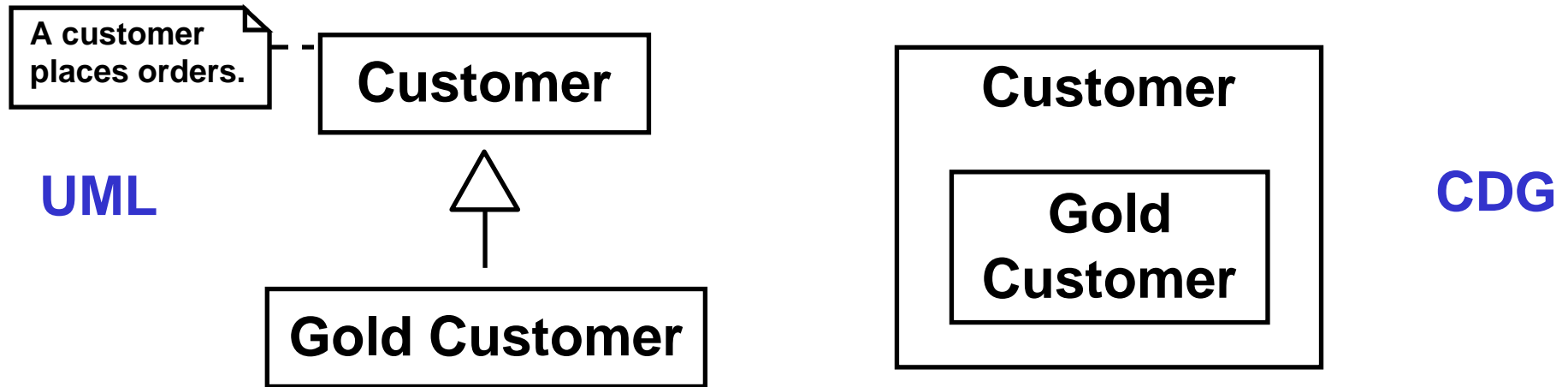


- Rule tells which customers are gold customers.

Structural Rules : Categorization

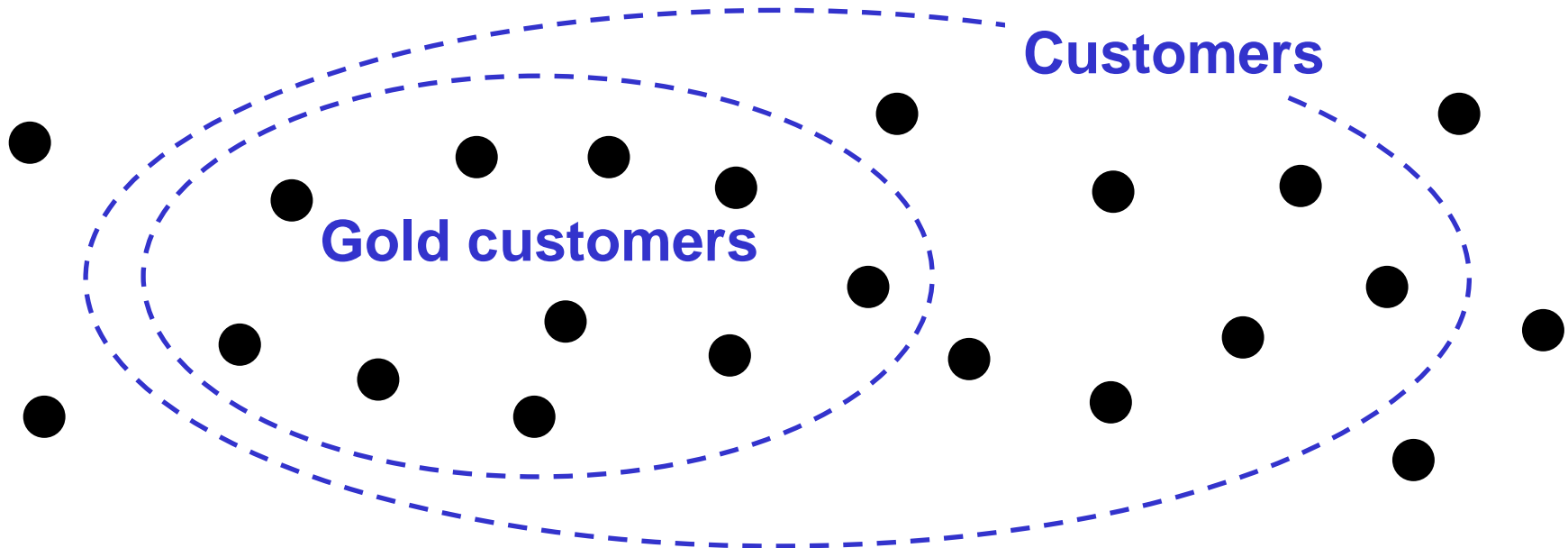
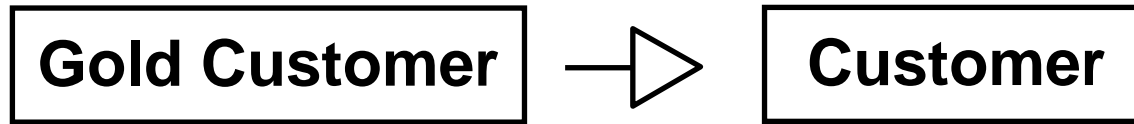
(Generalization)

- **Example: Gold customers are customers.**



- **All instances of special concept are instances of general (“gold customers are customers”).**
- **Rules for general concept apply to (instances of) subconcept.**

Structural Rules : Categorization



- All gold customers are customers.

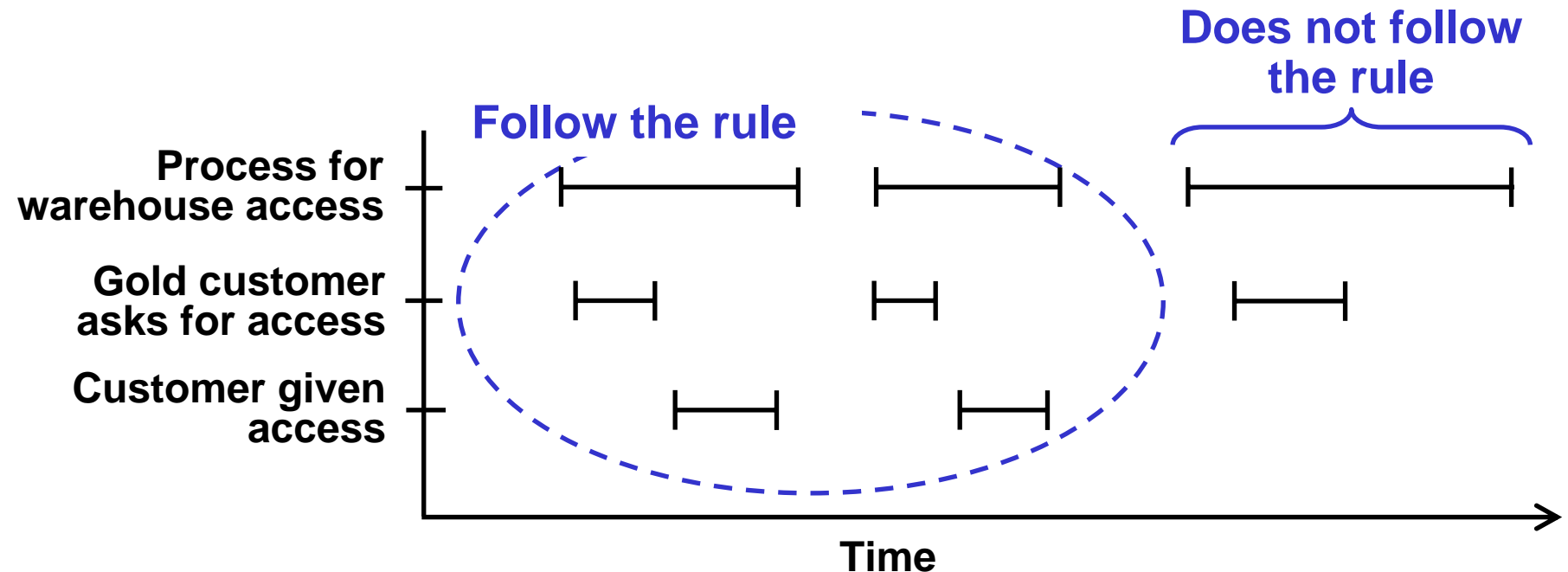
Operative Rules

- **Operative rules govern conduct of business activity.***
- **Example: Gold customers must be given access to the warehouse.**
- **Applies to all processes of the business that give access to the warehouse.**
- **Might be violated during course of business.***

* SBVR, 2007. Ross, R., Business Rule Concepts, 2005.

Operative Rules

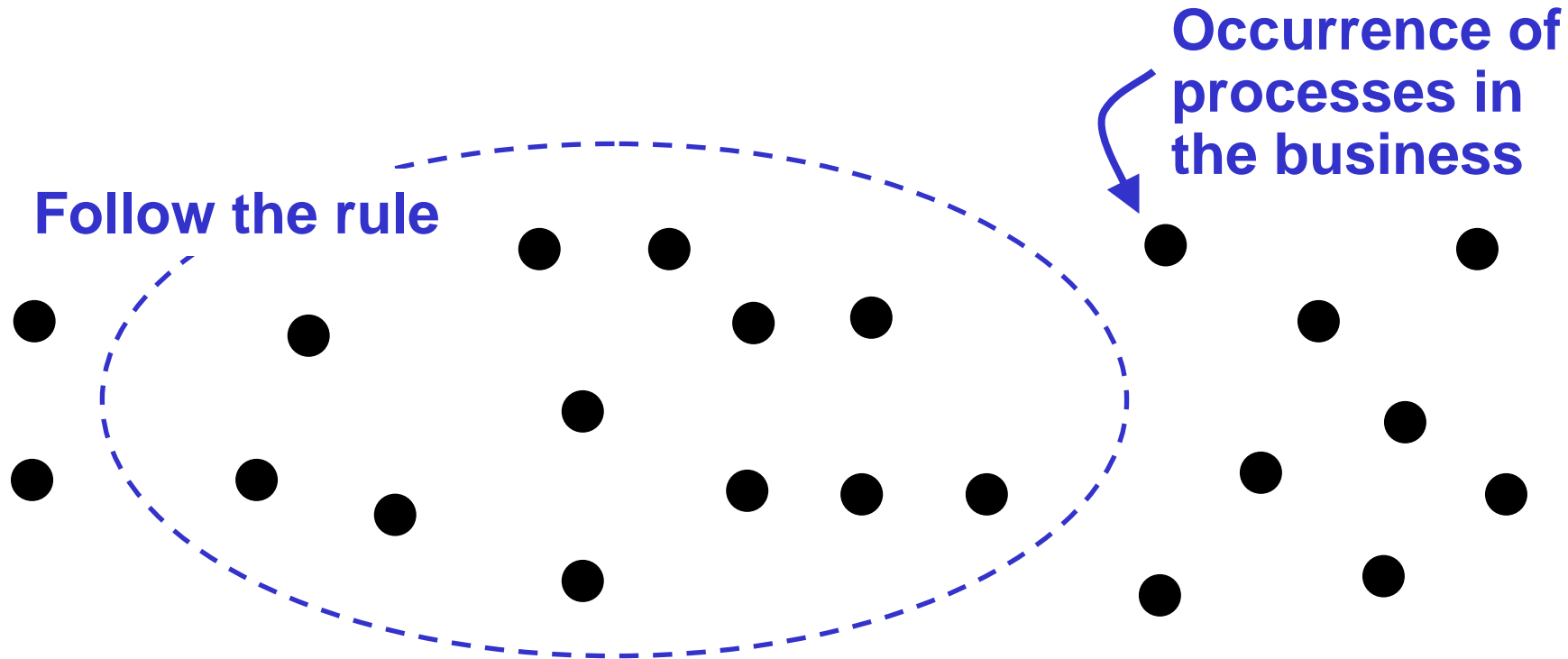
Gold customers must be given access to the warehouse.



- Some occurrences (executions / performance / enactments) of processes in the business satisfy the rule, others don't.

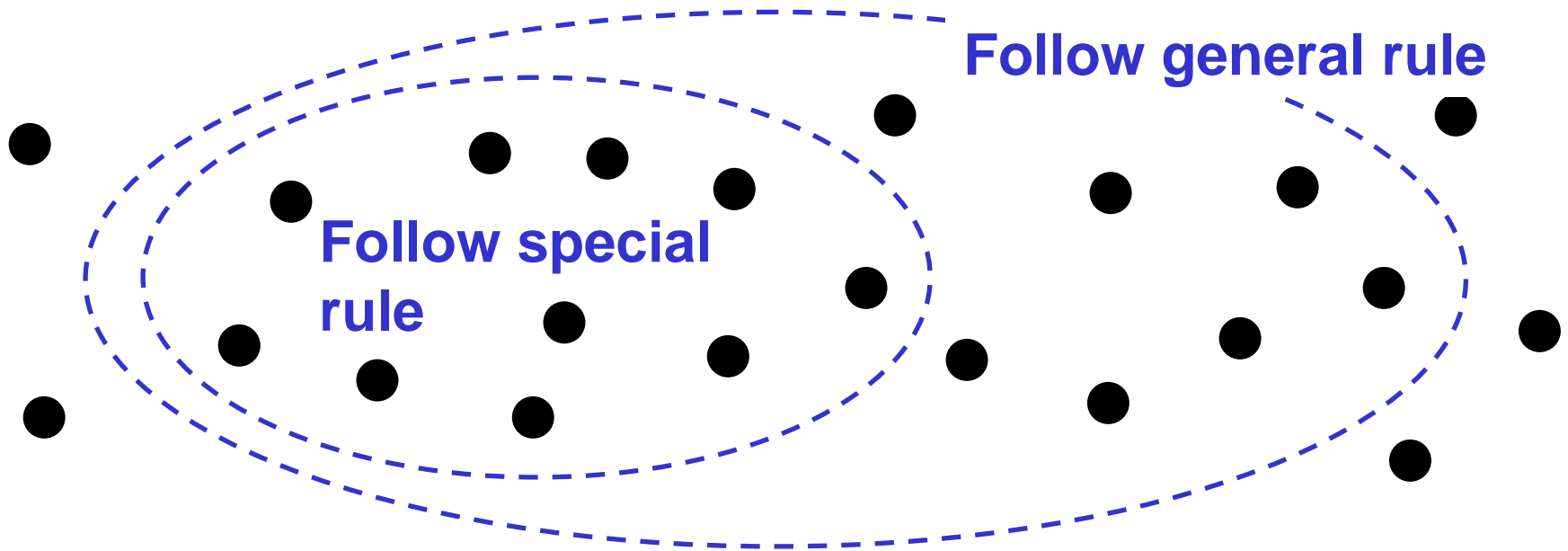
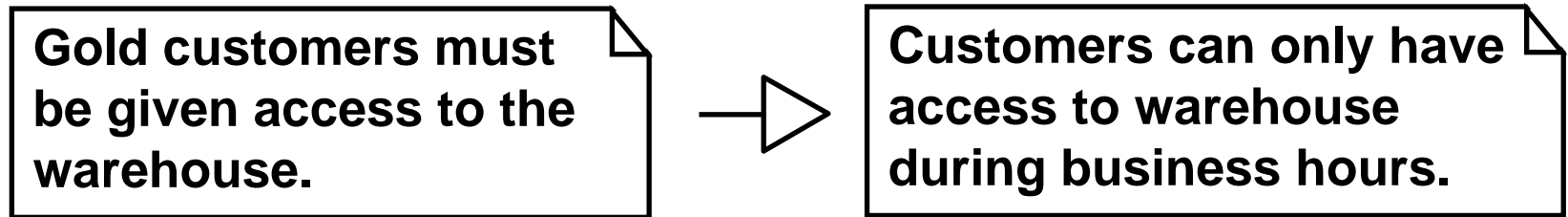
Operative Rules

Gold customers must be given access to the warehouse.



- Some occurrences follow the rule, some don't!

Operative Rules : Categorization

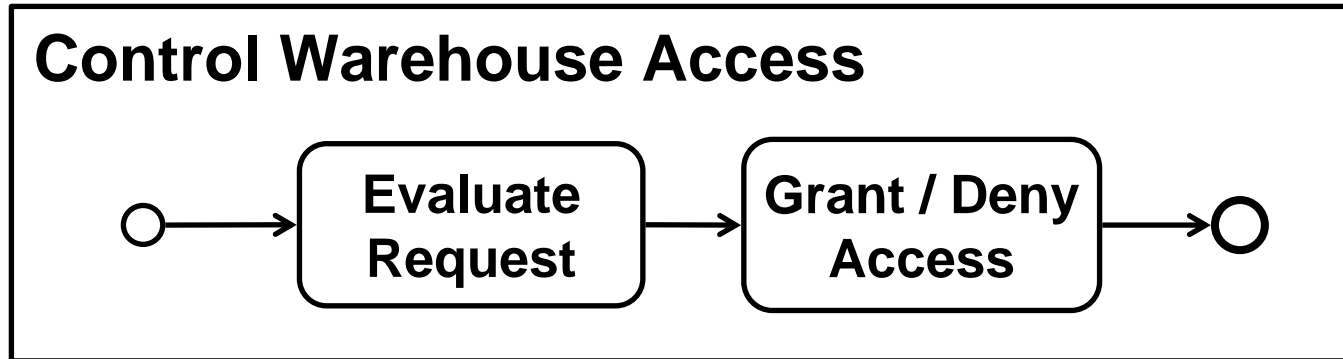


- All occurrences of processes following special rule should follow general rule.

Rules and Processes

- **Process definitions and operative rules both:**
 - specify what should happen in the business.
 - might be violated during course of business.
- **Correspond to the original goals:**
 - Check consistency before deployment.
 - Monitor after deployment.

Process Definitions

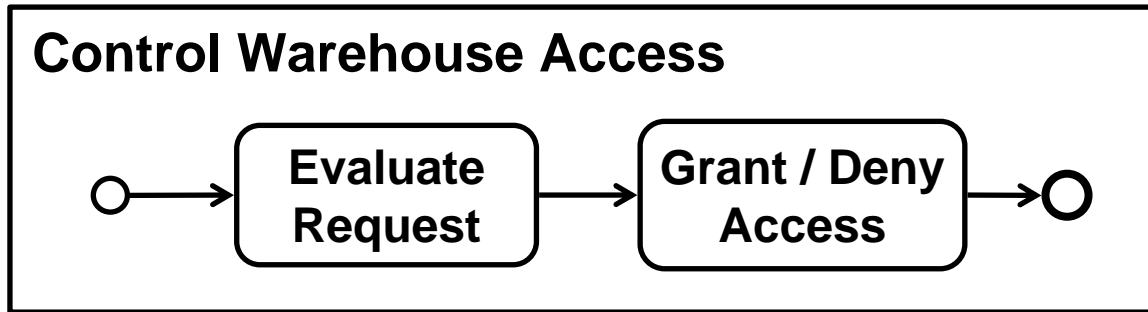


Could be expressed as operative rule:

For every occurrence of Control Warehouse Access, there are occurrences of Evaluate and Grant / Deny Access, the first before the second.

- **Could write entire process model as operative rules, just a matter of ergonomics.**

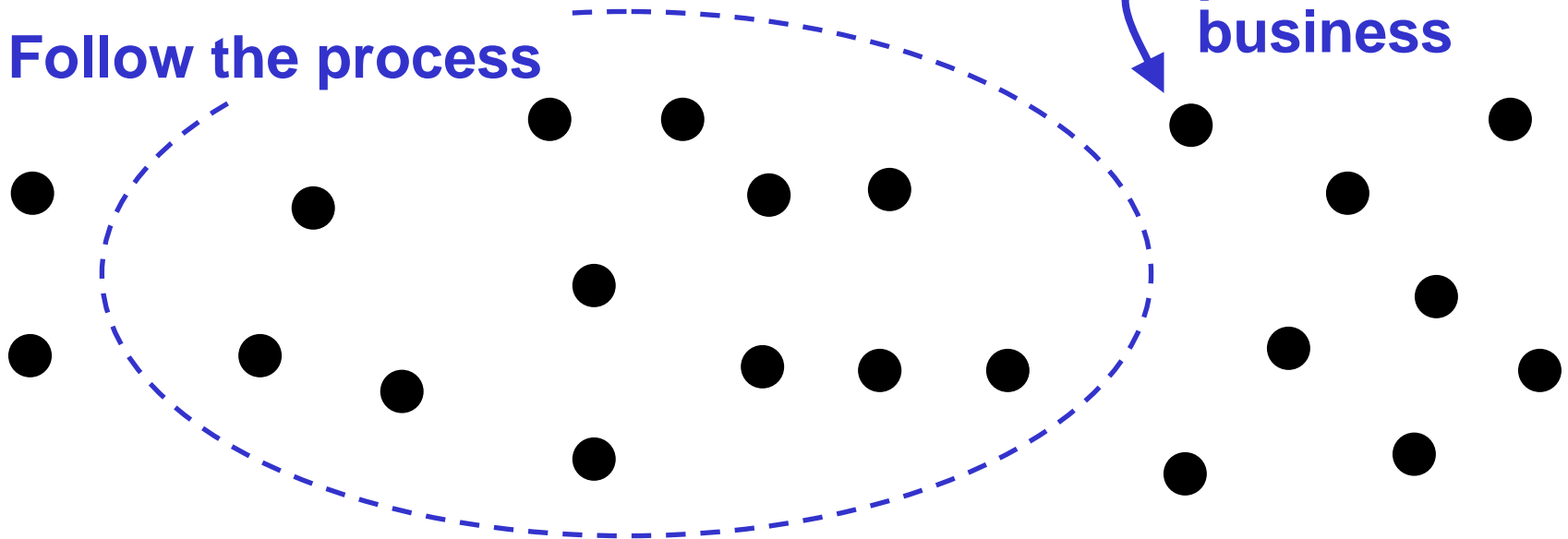
Process Definitions



For every occurrence of Control Warehouse Access, there are occurrences of Evaluate and Grant / Deny Access, the first before the second.

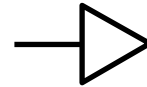
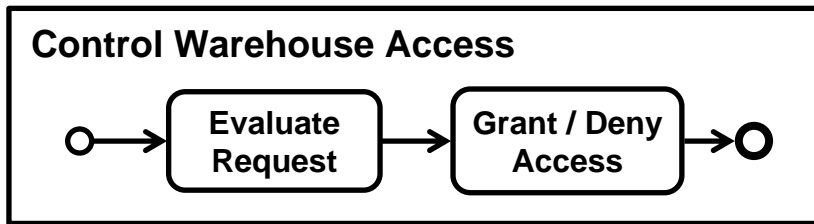
Follow the process

Occurrence of process in the business

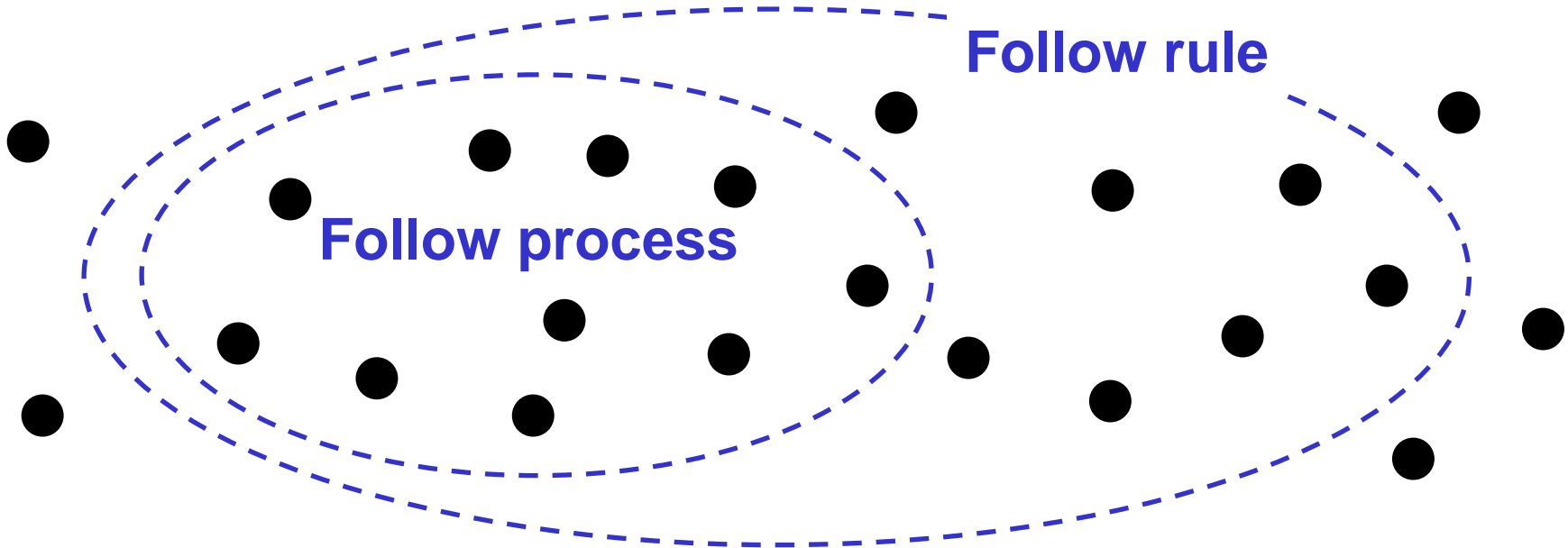


- Some occurrences follow the process definition, some don't.

Rule / Process Consistency

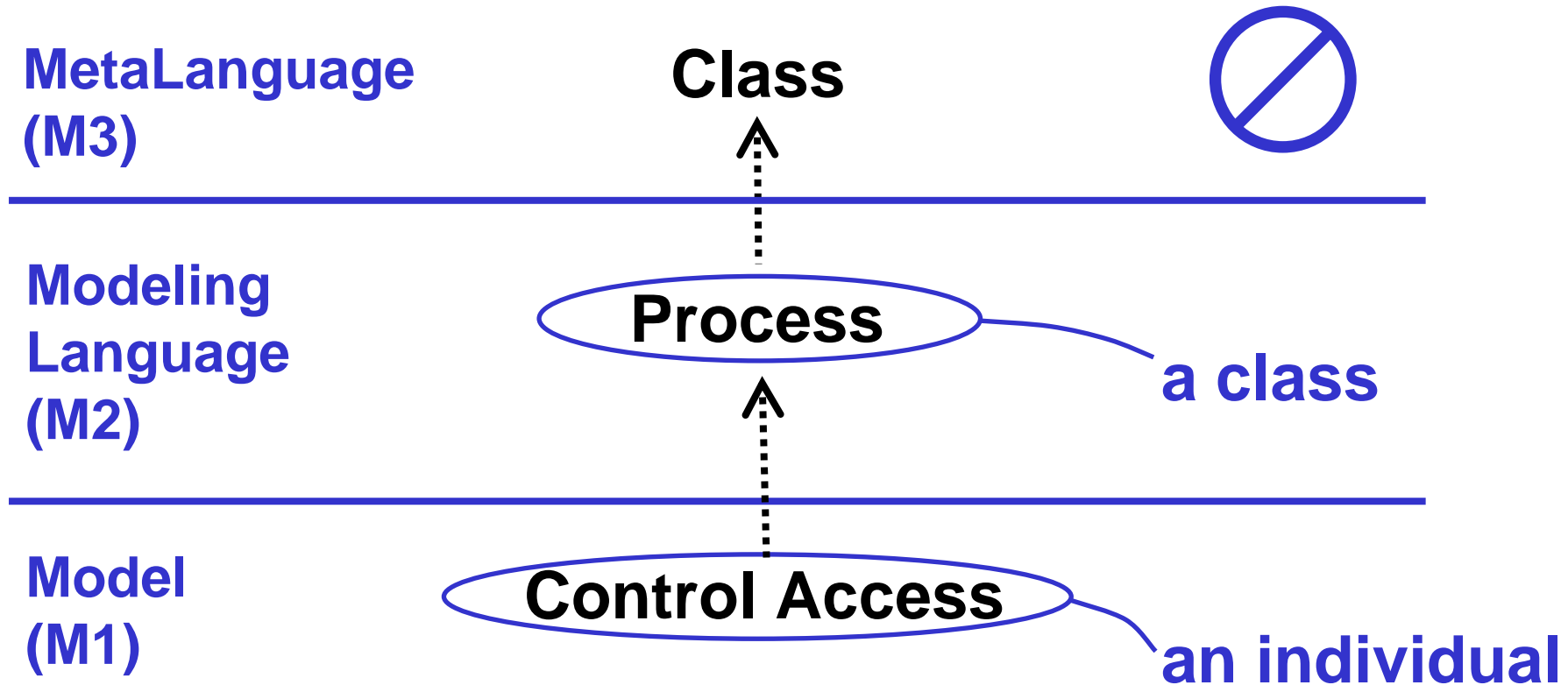


Gold customers must be given access to the warehouse.



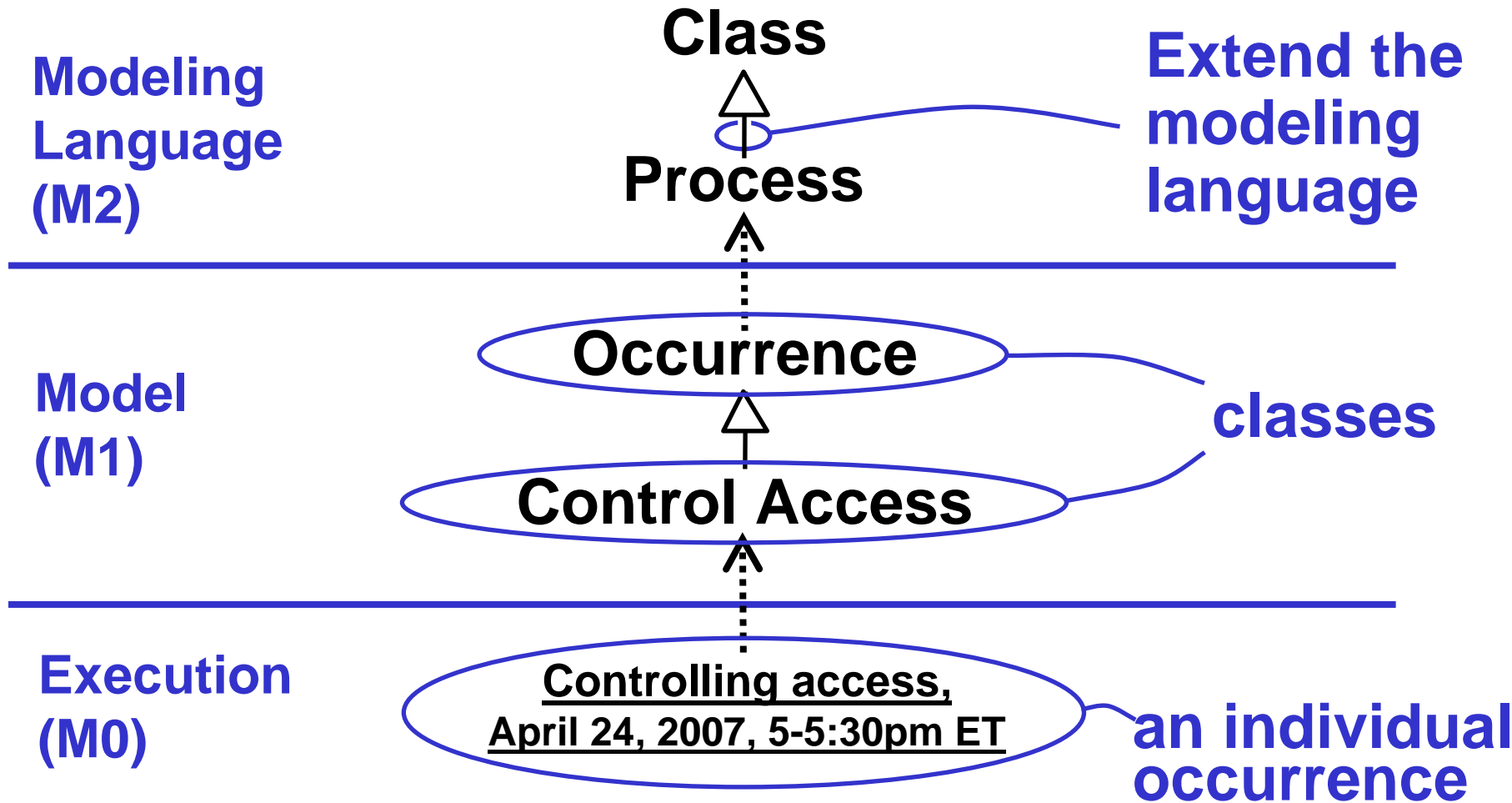
- All occurrences following process definition should follow the rule.
- Check before or after deployment.

Modeling Without Occurrences



- **Cannot instantiate and specialize process models (they are individuals, not classes).**
- **Unrelated to occurrences (M0).**

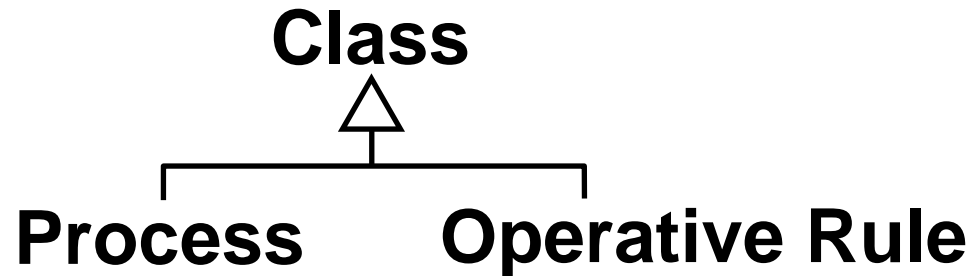
Modeling With Occurrences



- **M1 process models and rules are classes, can be specialized in M1 and instantiated at M0.**
- **Occurrence = Class of all occurrences.**
 - Superclass of all process models. Introduces runtime attributes.
 - In BPDM model library: Universal Behavior.

Modeling With Occurrences

Modeling
Language
(M2)



Model
(M1)



Execution
(M0)

Controlling access,
April 24, 2007, 5-5:30pm ET

- M1 process models and rules are classes, can be specialized in M1 and instantiated at M0.
- M1 process and rules apply to M0 occurrences.

Summary

- **The semantics of operative rules and process definitions are in occurrences (performance / enactment / execution) of processes.**
- **Enables consistency checking before deployment and monitoring afterwards.**
- **Process and rule models should extend metalanguages to incorporate occurrences (see BPDM for processes, <http://www.omg.org/cgi-bin/doc?dtd/07-11-01>).**