

An Aspect-Oriented Approach to Developing UML Models of Access Control Systems

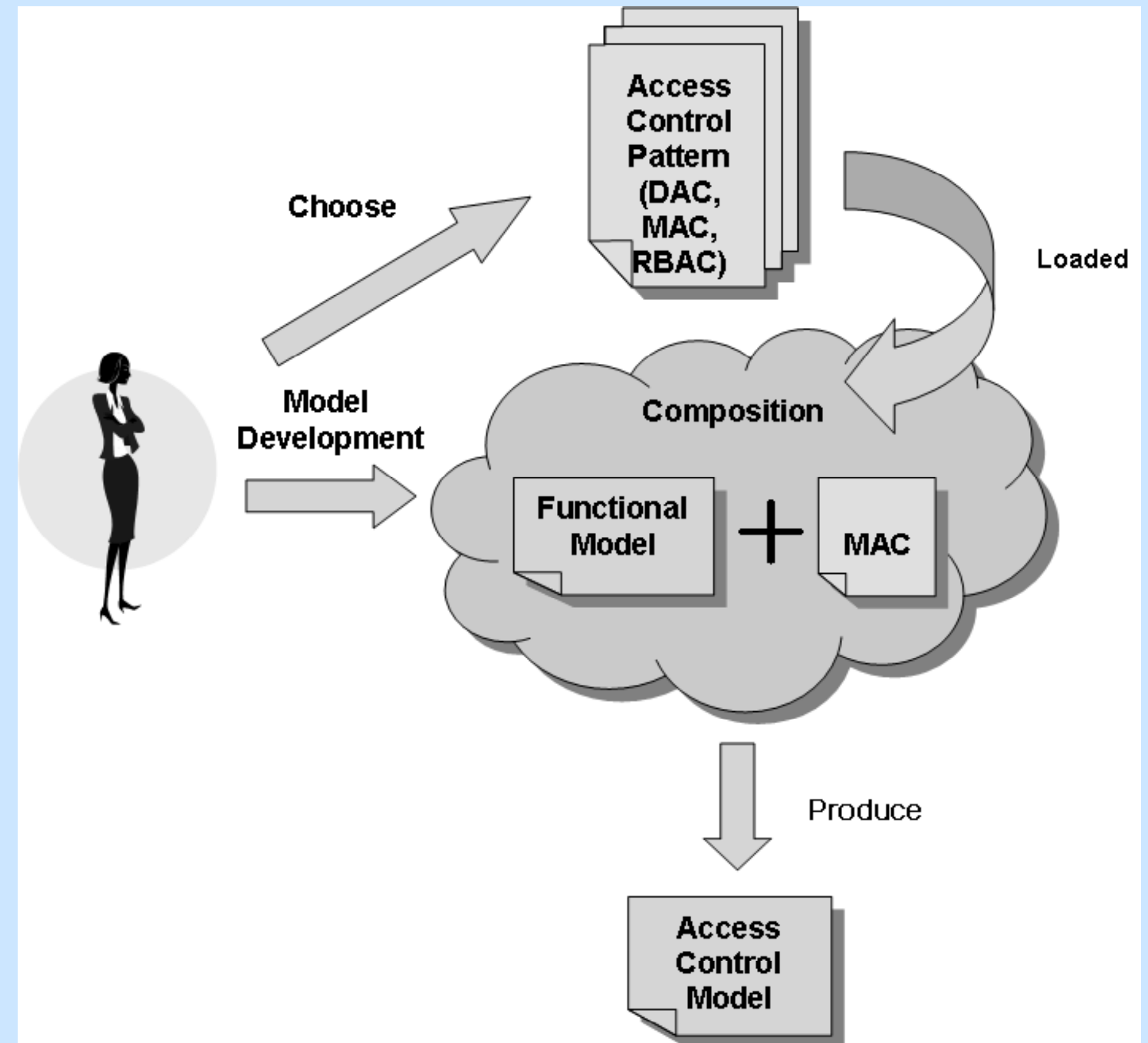


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Separation of Access Control

The development of access control systems is highly complex due to the cross-cutting nature of access control over the system's functionality. The complexity can be effectively managed by separating access control from the functional aspects of the system at a high level of abstraction. An access control aspect is designed in a system-independent and reusable form. The access control design is then used to embed automatically access control into the functional models, which produces a model of the system being developed.



Aspect-Oriented Approach

- Separation of access control aspects from functional aspects
- Design them separately
- Compose them later
- The resulting model is a model of an access control system

Research Impact

- Highly reusable designs of access control models
- Mechanical embedment of access control into functional aspects
- Efficient and rigorous development of access control systems

Research Progress

- ❑ Modeling Functional Aspects
 - Using the Unified Modeling Language
- ❑ Modeling Access Control Aspects
 - Using the Role-Based Metamodeling Language
 - Modeled Role-Based Access Control
 - Modeled Mandatory Access Control
 - Modeled Discretionary Access Control
- ❑ Composition
 - Developed composition algorithm
 - Developed composition rules for sequence diagrams
- ❑ Validation of Composed Models
 - Developed a divide-and-conquer technique
 - Developed a logic-programming based technique

Tool Development

- ❑ Developed Version 1 of Weaver
 - Developed as a plug-in to IBM Rational Rose
- ❑ Developed Version 1 of Evaluator
 - Implemented using Logic Programming

