

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



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Separation of Access Control

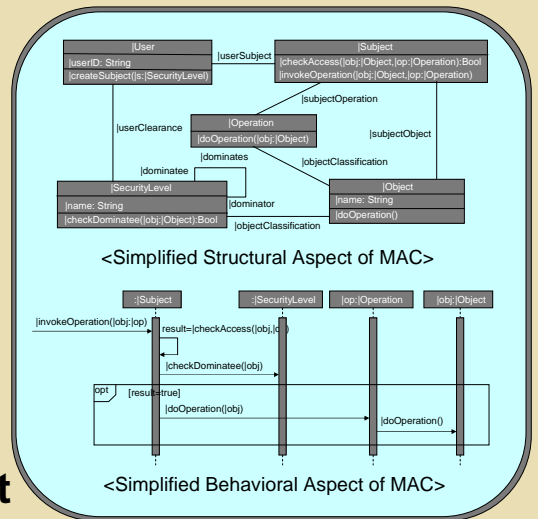
The development of access control systems involves high complexity due to the cross-cutting nature of access control mechanisms over the system's functionality. Complexity can be effectively managed by separating access control from the functionality of the system at a high level of abstraction.

Encapsulating Access Control as Design Aspect

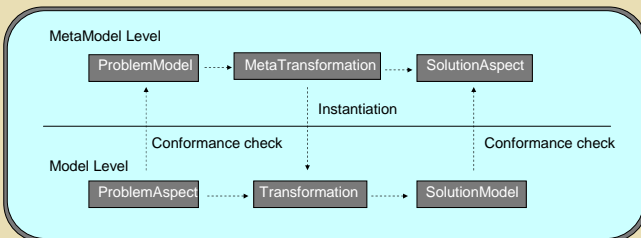
An access control mechanism is designed using an extension of the Unified Modeling Language (UML) as a security aspect which can be viewed as a special kind of patterns that has cross-cutting nature.

Access control mechanisms considered:

- Discretionary Access Control (DAC)
- Mandatory Access Control (MAC)
- Role-Based Access Control (RBAC).



Weaving Access Control Aspect



1. Check the applicability of the problem model to the problem aspect
2. Instantiate the meta-transformation in the context of the application

3. Apply the instantiated transformation
4. Check the conformance of the resulting model to the solution aspect

Analysis of Woven Model

1. Model consistency
2. Behavior preservation
3. Policy constraints
4. Security assurance

Research Progress

- Full specifications of the three access control mechanisms
- Generic transformation algorithm
- Techniques for applicability/conformance checking

