

Foundational and Applied Research in Access Control

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Administrative Models for Hierarchical RBAC

- **Problem:**
Who is authorized to change state and how?
- **Approach: Administrative Permissions**
- **Practical Requirements:**
 - Scale with users, roles
 - Support arbitrary role hierarchies
 - Lend itself to automation
- **Security Analysis Requirements:**
 - Tractable safety, availability
 - Broad class of queries

Fast Query Entailment in Hierarchical RBAC

- **Support for a broad class of queries**
 - Access request
 - Review Functions
- **Support for efficient updates**
- **Polynomial worst case time not good enough:**
 - Large state
 - Decentralized storage
- **Goal: On average, constant time query answering and update**
- **Approach: use modified Bloom Filter**

The Expressive Power of Access Control Models

- **Expressive Power based on reduction of security analysis**
- **Access Control Model expressed as triple of states, transition rules and queries**
- **Security Analysis instances:**
 - Is there a reachable state for which q is true?
 - Is q true for all reachable states?
- **Reduction preserves security properties: algorithms for security analysis in one model can be used for another**

Relating Access Control and Trust Management

- **Based on expressive power:**
 - Reduction
 - State matching reduction
- **H-RBAC with user assignment reduced to RT0 without linking**
- **H-RBAC with user assignment and revocation reduced to RT0**
- **Complexity results for safety and availability for one apply to the other**