Self-Generation of Access Control Policies

Scenarios and Approaches

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Scenarios

- Dynamic environments
- Interacting resources
- Changing context

Car Navigation System

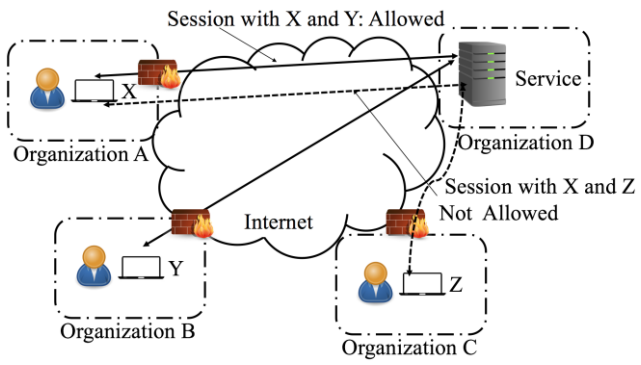
Information available to any person with access

Context information for determining access (location, presence of driver, etc.)

Partner Information Access

Inter-organizational collaboration

Context: Identities, affiliations, business arrangements and trust relationships

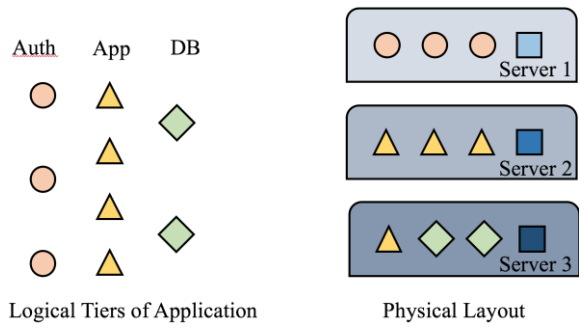


Elastic Data Centers

Virtual machines, Docker containers, Kubernetes, micro-services, etc.

Multiple parallel tasks

Virtual components are changing rapidly

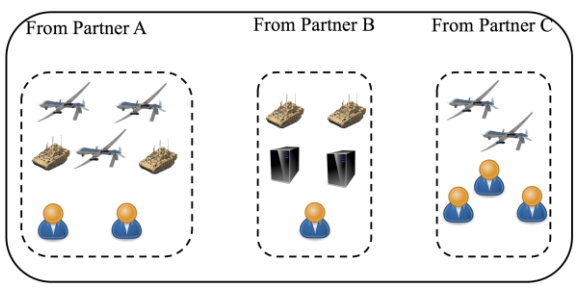


Coalition Resource Sharing

Dynamic communities of interest (CoI)

Resources shared

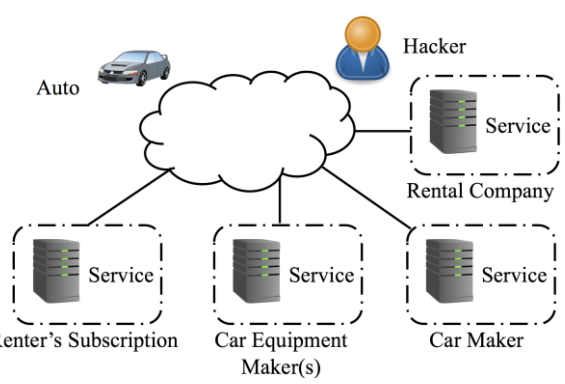
Access granted and removed dynamically as CoIs are formed and disbanded



Client Side IoT Security

Devices connected to Internet services

Context: rental status, car location, condition of automobile and its components

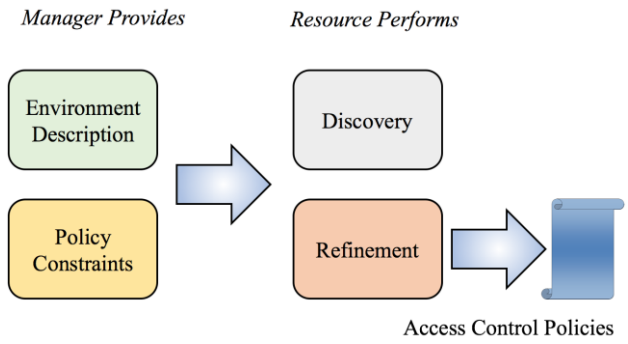


Access control approaches

- Model based
- State transition based
- ML based

Dynamic Refinement from Environment Specification

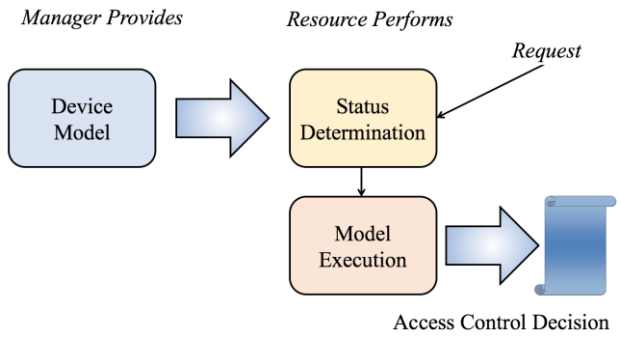
Description of operating environment and policy constraints give high-level guidance on access control decisions



Device Model based Access Control

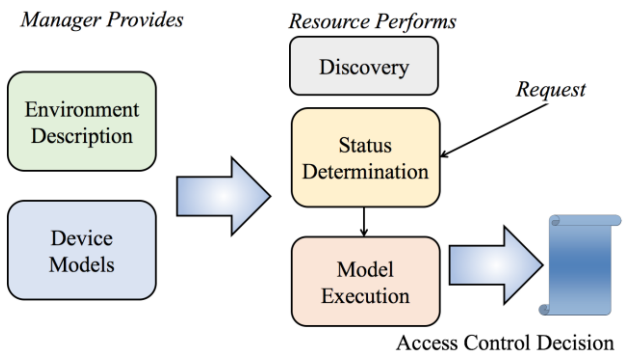
Model of impact of execution of any operation on device safety

Decision based on expected outcome of each transaction request



Networked Environment Model driven Access Control

Safety of device may depend on the state of other devices in the environment

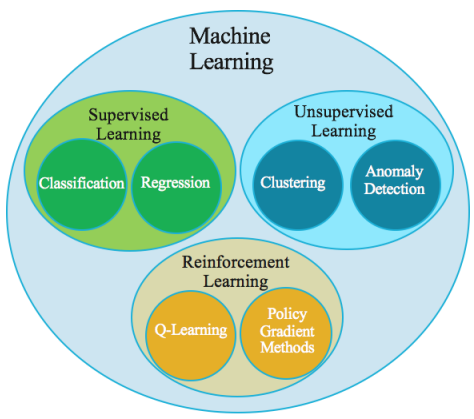


Machine Learning based Access Control

Initial specification defines safe and unsafe states

Impact of requests on state variables recorded

System builds model for the device based on its actual operation



Sharing of Models

Distributed Learning

Distributed Analytics and Information Science International Technology Alliance
Annual Fall Meeting, September 2018