Lecture 15

Tuesday, 25 October 2022 10:43

Subject $\xrightarrow[\text{request}]{\text{makes}}$ policy $\rightarrow$? decision

decision sets $D_2 = \{1, 0\}$ deny

↑ permit

$D_3 = \{1, 0, \bot\}$

↑ not applicable

$D_4 = \{\emptyset, 0, 1, \{1, 0\}\}$

or

$D_4 = \{P, D, NA, I\}$

$D_6 = \{P, D, NA, I\{P\}, I\{D\}, I\{PD\}\}$

$D_7 = \mathcal{P}(D_3) \setminus \emptyset$ powerset

$\{1\}, \{0\}, \{\bot\}, \{1, \bot\}, \{0, \bot\}, \{1, 0\}, \{1, 0, \bot\}$

weak con-/disjunction $\rightarrow$ $\bot$ takes precedence

strong con-/disjunction $\rightarrow$ 0, 1 takes precedence

D_7: operators over D_3 extended point-wise

$$\overline{op}(X, Y) = \{op(x, y) \mid x \in X, y \in Y\}$$

$\tilde{\sqcup}$	1	0	$\bot$
1	1	1	1
0	1	0	$\bot$
$\bot$	1	$\bot$	$\bot$

strong disjunction

$\hat{\sqcup}$	1	0	$\bot$	1,$\bot$	0,$\bot$	1,0	1,0,$\bot$
1	1	1	1	1	1	1	1
0	1	0	$\bot$	1,$\bot$	0,$\bot$	1,0	1,0,$\bot$
$\bot$	1	$\bot$	$\bot$				
1,$\bot$	1			1,$\bot$			
0,$\bot$	1						
1,0	1						
1,0,$\bot$	1			1,$\bot$	1,0,$\bot$	1,0,$\bot$	1,0,$\bot$

reduction of decision sets allows for re-use of operators over smaller decision sets

as well as to enable interoperability between sets

A decision reduction maps a decision set into a smaller decision set by mapping all decisions of a set to decisions of a subset, while leaving the decisions in the subset unchanged.

A reduction is safe with respect to an operator $\square$ if and only if $\boxed{\rho(a \square b) = \rho(a) \square \rho(b)}$

for all a and b in the larger decision set

a reduction is safe for a combination of operators iff it is safe for every operator individually

if two reductions are safe for an operator, then their composition $\rho_2 \circ \rho_1$ is also safe for that operator note: this is a sufficient condition, but not a necessary one.

Permit- and deny-overrides do not use a safe reduction in XACML v3.