

Privacy-aware Access Control II

**Homework (Deadline: 18/10/2022)**

► Study policy comparison algorithm

► Let  $pol$  be an EPAL policy defined over a vocabulary  $Voc$  where  $Voc$  consists of the user, data, purpose and action hierarchies below.

( ) User Hierarchy

( ) Data Hierarchy

( ) Purpose Hierarchy

( ) Action Hierarchy

$pol = \left\{ \begin{array}{l} ((u_2, d_3, p_2, a_1)) (+, true, o_1) \\ ((u_1, d_3, p_2, a_2)) (+, true, o_2) \\ ((u_4, d_3, p_4, a_2)) (+, true, o_3) \\ ((u_6, d_2, p_3, a_1)) (-, true, o_4) \\ ((u_1, d_2, p_1, a_4)) (+, true, o_5) \\ \text{Default ruling: } - \\ \text{Default obligations: } \{o_6\} \end{array} \right.$

Evaluate the following access requests against  $pol$ :

$req_1 = (u_3, d_4, p_1, a_6)$   
 $req_2 = (u_4, d_3, p_4, a_4)$   
 $req_3 = (u_6, d_2, p_3, a_1)$   
 $req_4 = (u_5, d_1, p_2, a_6)$

rule 1 has an allow ruling, so we check down the hierarchy

we have  $u_2 \not\geq u_3$ , so rule 1 does not apply

rule 2 has a 0-ruling, so we check down the hierarchy

we have  $u_1 \geq u_3$

we have  $d_3 \not\geq d_4$

we have  $p_2 \geq p_4$

we have  $a_0 \geq a_4$

since rule 2 applies and we add  $o_2$  as an obligation to the output *not correct*

rule 3  
 $u_4 \not\geq u_3$ , so this rule does not apply

rule 4  
 $u_6 \not\geq u_3$ , so this rule does not apply

rule 5  
 $u_1 \geq u_3$   
 $d_0 \geq d_4$   
 $p_1 \geq p_1$   
 $a_0 \geq a_3$ , so this rule applies and we add  $o_5$  to the obligations

we arrive at the default ruling, which we return along with the accumulated and default obligations; here, we return

$(-, o_2 \cup o_5 \cup o_6)$   
*this part is wrong*

$req_2$

rule 1  
 $u_2 \not\geq u_4$ , so this rule does not apply

rule 2  
 $u_1 \geq u_4$   
 $d_3 \geq d_3$   
 $p_2 \geq p_4$   
 $a_0 \geq a_4$ , so this rule applies → accumulate  $o_2$

rule 3  
 $u_4 \geq u_4$   
 $d_0 \geq d_3$   
 $p_4 \geq p_4$   
 $a_2 \geq a_4$ , so this rule applies →

$(+, o_2 \cup o_3)$

$req_3$

rule 1  
 $u_2 \geq u_6$   
 $d_3 \not\geq d_0$  → does not apply

rule 2  
 $d_3 \not\geq d_0$  → does not apply

rule 3  
 $u_4 \not\geq u_6$  → does not apply  
 $d_0 \geq d_0$

rule 4  
 $u_6 \leq u_6$   
 $d_2 \leq d_0$   
 $p_3 \leq p_0$   
 $a_1 \leq a_1$  → rule applies →

$(-, o_4)$

$req_4$

rule 1  
 $d_3 \not\geq d_1$  → does not apply

rule 2  
 $d_3 \not\geq d_1$  → does not apply

rule 3  
 $u_4 \not\geq u_5$  → does not apply

rule 4  
 $u_6 \not\geq u_5$  → does not apply

rule 5  
 $u_1 \not\geq u_5$  → does not apply

↓

return default ruling + obligations →  $(-, o_6)$