FACPL

1 The FACPL language

1.1 Syntax

Table 1: Syntax of Formal Access Control Policy Language (FACPL)

Policy Authorisation Systems	$PAS ::=$	$(\,\textsf{pep} : EnfAlg \quad \textsf{pdp} : PDP \quad \textsf{status} : Attribute$
Attribute	$Attribute ::=$	$Type\ Identifier\ (= Value)^?$
Type	$Type ::=$	$\textsf{int} \mid \textsf{boolean} \mid \textsf{date} \mid \textsf{float} \mid \textsf{List}$
Enforcement algorithms	$EnfAlg ::=$	$\textsf{base} \mid \textsf{deny-biased} \mid \textsf{permit-biased}$
Policy Decision Points	$PDP ::=$	$\{Alg\ \ \textsf{policies} : Policy^+\}$
Combining algorithms	$Alg ::=$	$\textsf{p-over}_\delta \mid \textsf{d-over}_\delta \mid \textsf{d-unless-p}_\delta \mid \textsf{p-unless-d}_\delta$
		$\mid \textsf{first-app}_\delta \mid \textsf{one-app}_\delta \mid \textsf{weak-con}_\delta \mid \textsf{strong-con}_\delta$
fulfilment strategies	$\delta ::=$	$\textsf{greedy} \mid \textsf{all}$
Policies	$Policy ::=$	$(Effect\ \ \textsf{target} : Expr\ \ \textsf{obl} : Obligation^*\,)$
		$\mid \{Alg\ \ \textsf{target} : Expr\ \ \textsf{policies} : Policy^+\ \ \textsf{obl} : Obligation^*\,\}$
Effects	$Effect ::=$	$\textsf{permit} \mid \textsf{deny}$
Obligations	$Obligation ::=$	$[\,Effect\ \ ObType\ \ PepAction(Expr^*)\,]$
PepAction	$PepAction ::=$	$\textsf{add}(Attribute, \textsf{int}) \mid$
		$\mid \textsf{flag}(Attribute, \textsf{boolean}) \mid \textsf{sumDate}(Attribute, \textsf{date})$
		$\mid \textsf{add-List}(Name) \mid \textsf{remove-List}(Name)$
Obligation Types	$ObType ::=$	$red\textsf{M} \mid red\textsf{O}$
Expressions	$Expr ::=$	$Name \mid Value$
		$\mid \textsf{and}(Expr, Expr) \mid \textsf{or}(Expr, Expr) \mid \textsf{not}(Expr)$
		$\mid \textsf{equal}(Expr, Expr) \mid \textsf{in}(Expr, Expr)$
		$\mid \textsf{greater-than}(Expr, Expr) \mid \textsf{add}(Expr, Expr)$
		$\mid \textsf{subtract}(Expr, Expr) \mid \textsf{divide}(Expr, Expr)$
		$\mid \textsf{multiply}(Expr, Expr) \mid \textsf{less-than}(Expr, Expr)$
		$\mid \textsf{list-is-empty}(Expr) \mid \textsf{list-element}(Expr, Expr)$
Attribute Names	$Name ::=$	$Identifier/Identifier \mid \textsf{Status}/Identifier$
Literal Values	$Value ::=$	$\textsf{true} \mid \textsf{false} \mid Double \mid String \mid Date$
Requests	$Request ::=$	$(Name, Value)^+$

Table 2: Auxiliary Syntax for FACPL responses

PDP Responses	$PDPResponse ::= \langle Decision \quad FObligation^* \rangle$
Decisions	$Decision ::=$ permit $\mid$ deny $\mid$ not-app $\mid$ indet
Fulfilled obligations	$FObligation ::= [\, ObType \quad PepAction(Value^*)\,]$