Verification of Secure Cloud-based Workflow Services

Abdulrahman Almutairi*, Zahid Pervaiz*, Basit Shafiq**, and Arif Ghafoor*

* Electrical and Computer Engineering, Purdue University
** Lahore University of Management Sciences

Objective
Verification of composition of cloud based service workflows for conflicts with time dependant domain security policies

Challenges
- Each cloud customer is an autonomous domain with its time dependant security policies expressed in GTRBAC
- The workflow has temporal constraints and assumed to be invoked on recurrent basis.
- Dynamic security policies for cloud customers to handle elasticity of cloud services

Proposed Approach

Generlized Temporal Role Base Access Control (GTRBAC)
- An extension of RBAC with temporal constraints.
- At any time a role can be one of three states
  i) Disable state
  ii) Enable state
  iii) Active state

PW Verification of Domain’s FSM

Diagram showing the interaction model (IM) FSM of a domain and the projected workflow (PW) specification in GTRBAC semantics.