A GTRBAC Based System for Workflow Composition and Management
Basit Shafiq, Arjmand Samuel, Elisa Bertino, and Arif Ghafoor

GOAL
Adaptable, Context Aware, Secure Workflow Management System for Dynamic Collaboration

ADAPTABILITY
Dynamic reconfiguration of workflows to ensure serviceability and security in changing environment

SECURITY
Authentication and authorization of users to ensure secure accessibility in a collaborative environment

CONTEXT AWARENESS
Environment sensitive accessibility of data and services

To provide the right data to the right person at the right time

An authoring tool for specification of workflow tasks and task inter-dependencies.

Authoring:
- Dynamic constraints
- Separation of duties
- Task execution cardinality constraints
- GTRBAC formalism used

Consistency analyzer:
- Checking consistency
- Correctness of the composed workflow
- Task dependencies
- Deadlines
- Constraint conflicts

Monitors:
- Changes in the environmental context like (Time, ambient conditions etc)
- Changes in user context (location of user, skill level of users etc)
- Occurrence of unpredictable events

Workflow Initiator
Status Monitor
Configuration/Adaptation
Event Notification
User Request

Workflow Authoring
Consistency Analyzer
Work Flow Composition Module

Work Flow Initiator
Status Monitor
Configuration/Adaptation
Event Notification
User Request

Policy Evaluation
Access Control Module

GT R B A C Policy Base

User Credentials
Environmental Context Information
Role Mapping

Access Control Module

Responsible for instantiation of a workflow
- Notifies users of system events
- Adapts workflow and/or invocations based on situation and context
- Optimal reconfiguration of instantiated workflow:
  - Minimum deviation from scheduled activities
  - Partial completion of workflow instance with abortion of blocked task
  - Minimum relaxation of constraints

Determines authorization of users for execution of workflow tasks
- Policy base of all roles and users
- Performs user to role mapping and task to role mapping
  - Mapping based on user credentials and environmental context