Using a generic policy-based infrastructure for implementing business processes

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Presentation outline

• Background and open policy issues
• Policy concepts
  – Policy
  – Policy rule
  – Policy group
  – Policy execution environment
• Policy and Business processes
  – Policy groups for business processes
• Example: SLA Negotiation Policies in the FORM project
• Conclusions
• Future plans
Background and Open Issues

- Background work
  - TMF Policy Group
  - Imperial College work
  - IETF/DMTF: PCIM and CIM
  - IST projects (Tequila, Cadenus, Aquila, etc)

- Open issues
  - Policy taxonomy
  - Generic policy language
  - High/Low level policy organisation
  - Transformation between high and low level policies
  - Policy validation
  - Conflict resolution
  - Policy domains
  - Security concerns

Policy concepts

- Event
  - Triggers the evaluation of a condition in a policy rule

- Condition
  - If a policy rule condition evaluates to be true an action will take place

- Action
  - A process that is executed depending on the evaluation of a condition in a policy rule

- Policy rule
  - Expresses policy
  - Format: when <event>, if <condition> then <action>

- Policy group
  - A set of policy rules that concern a particular application area
  - Has the form of a single policy rule
  - Format: when <event>, if <policy rules evaluation> then <policy group actions>
Policy group features

- **Conflict free**: no unresolved conflicts among policies of the same policy group
- **Execution unit**: policy group rules can be evaluated and executed in the same process
- **Evaluation unit**: policy group rules can require the evaluation of other policy groups but not of individual policy rules in other policy groups
- **Processing unit**: A policy group can only be processed as a whole. Therefore, no partial evaluation or execution of policy rules within a group is allowed
- **Reusable unit**: A policy group can be reused in different policy execution environments
- **Distribution unit**
- **Deployment unit**

Policy rule features

- **Processing unit**
- **Evaluation unit**, and
- Provided it comes with the specification of its events and its dependencies on other policy rules:
  - **Reusable unit**
  - **Distribution unit**
  - **Deployment unit**
Policy group information

### Policy Group Priority*

- Policy group dependencies:
  - `<policy group ID>`
  - ...

- Event dependencies:
  - `<unique event ID>`
  - ...

- Policy group ID (unique)
- Description
- Version number
- Rule evaluation pattern

- Policy group rules:
  - `<policy rule>`
  - `<policy rule>`
  - ...

- Policy group events:
  - `<unique event ID, event description>`

(*) execution environment specific

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Policy rule information

**PolicyRule**

- Events*: 1
- PolicyDependencies*: 1
- EventDependencies*: 0..n

**PolicyCondition**

- PolicyCondition Interpreter: 0..1
- PolicyCondition Statement: 1
- PolicyCondition Validator: 0..1

**PolicyAction**

- PolicyAction Interpreter: 0..1
- PolicyAction Statement: 1
- PolicyAction Validator: 0..1

(*) optional
Policy model qualities

- Policy language independent
- Applies to different application areas
- Policy semantics are out of the model
- Security information can be added
- Compatible with current IETF/DMTF policy models
- A base for the implementation of policy language independent PDP/PEPs
- Separation between PDP/PEP infrastructure and policy specification, interpretation and enforcement

Policy execution environment
Policy groups & Business Processes

- Business processes can share the same policy execution environment
- Each business process is implemented by one or more policy groups
- A policy group may be reused for different business processes
- Policy rules (together with relevant events and dependencies) can be reused in one or more policy groups.

Policy Hierarchy for Business Processes

TOP LAYER
- ROOT POLICIES
  These policies control the policy execution environment and the handling of the lower-level policies and policy groups

MIDDLE LAYER
- POLICY GROUPS
  Conflict-free units of policy distribution, deployment, reusability, processing, evaluation and execution. Contain one or more policy rules. Policy groups are contained in one or more root policies

BOTTOM LAYER
- POLICY RULES
  Under conditions units of reusability, distribution and deployment. They can only be contained in policy groups.
FORM: Goal and Approach

**GOAL**: To enable FORM’s industrial partners to exploit services, software systems and software components for the management of an outsourced Inter-Enterprise Service (IES) supporting B2B communication requirements

**APPROACH**: Definition of an Open Development Framework (ODF) addressing operational needs for IES management and development of management systems based on software components (Building Blocks)

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FORM Business Processes

[Diagram of FORM Business Processes]

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Implementation details

Policy Management GUI
Java XML-RPC client

Policy Manager

Policy Negotiation Engine
Event Engine

Policy Execution Engine

Policy Store

SLA Database
CMIS agent
Offering XML-CMIP g/w

Java
XML-RPC server/handler

Clock

XML/HTTP
XML-RPC (polML)
XML/HTTP

SLA Negotiation policy group

- Policy group ID: http://www.ist-form.org/pol_grp/SlaNeg
- Description: Policy group for controlling SLA Negotiation
- Version number: 3.1
- Rule evaluation pattern: all, sequentially
- Rules:
  - When (SLA_Request_Event), if (param(bw) > 2Mbps) then
    (Reject_SLA_Request, Propose_SLA_Alternative (bw, 2 Mbps))
- Events:
  - SLA_Request_Event (when a SLA Request is Received)
  - SLA_Customer_Confirmation (when a customer accepts a proposed SLA)
- Policy group dependencies:
- Event dependencies:
  - RM_Low_Resource_Availability
Conclusions

• A common policy execution environment for Business Processes is feasible
• The policy group concept can assist to using a policy based approach for business process implementation
• Added value from policy group reusability
• The generic policy model allows the execution of policies of different languages on the same execution environment
• Policy group specification for SLA negotiation is available

Further work

• Policies for business processes
  – Catalogue of events, conditions and actions that relate to specific business processes
  – Catalogue of policy rules
  – Catalogue of policy groups
• Complete the implementation of the policy execution environment
• New policy groups for order handling and other business processes
• Policy domains
• Security concerns