



Handling Dynamic Organizational Change with Community-Based Policy Management

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Outline

- Background on CBPM
- Rich-client interface design
- Dynamic Spectrum Allocation Use-Case
- Initial Usability Evaluation
- Future work



Community-based management background

- Essentially a **Meta-policy Management Framework**
- Community: grouping abstraction instead of e.g. roles



CBPM principles

- Divides Policy specification authority into a hierarchy of Communities
- Communities make policy authoring decisions within the envelop of authority granted to them
 - Resource management authority delegated from General to Specific levels
- Community members deal with localised policy set
- Community structure forms a **progressively grounded** model of the organisational structures involved



CBPM main features

- Fine grained control over the distribution of authority
- Collaborative decision making
- Management of organisational change



Rich-Client UI design

- Using CBPM principles
- Implementation
 - Java
 - Eclipse GMF (Graphical Modeling Framework)
 - Jboss Rules (drools) Rule Engine
- Use-Case
 - Dynamic Spectrum Access (DSA) using Software/Cognitive Radios
 - ◆ Potential for spectrum to be allocated on a needs basis



The screenshot displays the 'default10.policytool_diagram' window. The main area shows a hierarchical diagram with the following structure:

- TCD** (yellow box)
 - Band A (Resource Authority)** (orange box)
- KDEG** (orange box)
 - Band A (Resource Authority)** (green box)
 - sw radio access control policy** (cyan box)
 - Band B (Resource Authority)** (green box)
 - Director's Policy** (cyan box)
- NTRG** (orange box)
 - Band A (Resource Authority)** (green box)
 - sw radio main policy** (blue box)
- SoftwareRadio** (yellow box)
 - Band A** (pink box)

Connections are shown between TCD and KDEG, TCD and NTRG, KDEG and SoftwareRadio, and NTRG and SoftwareRadio.

The **Palette** on the right includes the following items:

- Select**
- Zoom** - Left click to zoom in, shift+left click to zoom out, drag to zoom to selection.
- Note** - Create a Note
- Connection** - Create new Connection
- FederalCommunity** - Create new FederalCommunity
- Policy** - Create new Policy
- Resource** - Create new Resource
- RootCommunity** - Create new RootCommunity
- SubCommunity** - Create new SubCommunity

The **Properties** panel at the bottom shows the details for the selected **Policy sw radio access control policy**:

Property	Value
Comments	
Community Members	
Community Name	KDEG
Policy Actions	Allow KDEG
Policy Conditions	Daytime
Policy Description	This policy will allow access to the software radio on Band A during daytime
Policy ID	
Policy Name	sw radio access control policy
Resources Affected	Band A

GMF-based Policy Engineering User Interface



Policy-based Management Properties

Policy Details and Conditions

Policy Name: sw radio access control policy

Community Name: KDEG

Policy Description: This policy will allow access to the software radio on Band A during daytime

Policy Conditions:
 Daytime

Policy Actions

Action Tree

- Actions
 - Allow <Community Name>
 - Disallow <Community Name>

Action Name: Allow KDEG

Resource Tree

- Resources
 - <Band Name>

Resource Name: Band A

Comments

Save Cancel Submit Policy

Policy Authoring Template



UI features

- Drag 'n Drop UI
- Easy to grasp hierarchy of authority
- Automatic conflict detection
- Assisted conflict resolution



UI usability evaluation

- Dynamic Spectrum Access Scenario
 - DSA Policy Specification
 - Policy conflict detection/resolution
- Participants
 - 10 volunteers
 - ◆ UML proficient
 - ◆ Little knowledge of Policy Based Systems
 - Experiment lasted ~30 mins
 - Users asked to create a Community structure based on the DSA scenario, write policies, detect conflict and resolve conflict
 - Filled in a questionnaire



UI usability evaluation contd.

■ Results

- 90% thought the interface was easy to use
- Area with most difficulty
 - ◆ Writing policies
 - △ A little prior knowledge of policy based management was beneficial
- Area with least difficulty
 - ◆ Creating and understanding Communities
- Things to improve
 - ◆ Conflict notification system
 - ◆ Use constrained menus for policy authoring
 - ◆ ...



Future Work

- Experiment with more complex scenarios
 - feedback signals, trouble tickets
- Add Semantic Reasoning part
 - Use Semantically-enhanced Resource trees
- Further integration with CBPM Policy Decision Service
- Use semiotic analysis to analyse weak spots / areas where the users had difficulties



For more information ... <http://kdeg.cs.tcd.ie>

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