Reconfiguration Service in Mobile Middleware

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Outline

• Motivation
• Reconfiguration
• Key Requirements
• Our Approach
• Challenges
• Work In Progress
• Related Work
Motivation

- Ubiquitous Applications
- Dynamically changing environment
- Variation in factors such as terminal size, power usage, etc.,
Reconfigurable System: Ability of a device to modify its constituent components, and therefore its mode of operation, to reflect changes in its operating environment

- Provide adaptive applications
- User can easily switch between devices
- Provide secured environment
- Helps to achieve power and network saving
- User freed from doing manual configurations!
Key Requirements of Reconfiguration Service

- Adaptability
- Extensibility
- Heterogeneity
- Portability
- System Integrity
- Fault tolerance
- Transparency
Reconfiguration Service in Middleware

Applications

Reconfiguration enabled Middleware

Platform Interface

Platform A

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Platform N
Reconfiguration Service Stack

- **Controller**
  - Predictor
  - Profile Mgr
  - Modeler
  - State Repo
  - Transact Mgr
  - Queue Mgr

- **Monitor**
  - Monitor Log
  - Decision Log

- **Actuators**
- **Profiler**
- **Decision Engine**
- **Monitor**
Challenges

- End user satisfaction
- Security issues such as authorization, authentication, delegation
- Fault tolerance
- Portability Issues
- System Integrity
- Resource constraints while doing computations
Work In Progress

• Prototype implementation and demonstrated a simple application using reconfiguration service (monitor input & policy based decisions)

• Design and Implementation of Decision Engine:
  - Prediction Algorithm to predict the future state of the device based on the past monitor inputs
  - Mathematical model to design the reconfiguration decision
  - Inputs: current monitor input, predictor output, past reconfiguration decision, policy, user preferences
  - Access to device description repository
User Scenario

- User scenario – 1: Moving the current email client application from user’s mobile phone to laptop or vice versa.

- User scenario – 2: Moving the current instant messaging application from the user’s mobile phone to laptop or vice versa.

- User scenario – 3: Uploading file from user’s laptop to his work repository using a low bandwidth network.

- User scenario – 4: Downloading emails with out attachments because of sudden drop in network bandwidth.
Related Work

- End-to-End Reconfigurability (E²R): http://e2r2.motlabs.com

- Ambient Networks: http://www.ambient-networks.org

THANK YOU!