RUDDER: Deductive Engine for Runtime Management

- Motivation and objective
- RUDDER architecture
- Agent architecture
- Autonomic application construction
- Challenges and future work
- Bibliography

Motivation and Objective

- Motivation
  - Autonomic applications change dynamically
  - Runtime access to and modifications of components and application
  - Composition described by programs limit the level of flexibility
  - Rules defined by system/user enable automatically adaptive composition
- Objective
  - Providing mechanisms for dynamically defining, configuring, deploying rules, and rule conflicts management
  - Runtime management services, supporting autonomic composition, adaptation, optimization and execution
RUDDER Architecture

Agent Architecture

- Goal-directed focus: focus on the objective and choose the method to achieve it.
- Context sensitivity: make decisions about what to try and retry based on present conditions.

BDI Agent Model

- An agent has beliefs about the world and desires to satisfy, driving it to form intentions to act.
  - Beliefs: about the environment and other agents
  - Desire or goals to achieve
  - Intention or plans to act upon to achieve its desires

Middleware Services

Composer

Agent

Application Layer

Component Layer

System Layer

Data

Control/Minidata

Query

Sub-Goal1

Rule Driven Workflow

Goal

Rule Driven Workflow

Sub-Goal2

Rule Driven Workflow

Sub-Goal3

Rule Driven Workflow

Component

Component agent

Component

Component agent

Component

Component agent

Component

Component agent

Middleware Services

Composer

Agent

Application

Component

System

Middleware Services
Agent Hierarchy Construction

Autonomic Application Construction

Challenges and Future Work

- How to define and deploy the rules to satisfy the application requirement and optimize performance
- How to guarantee consistency of environment after submitting change
  - Deadlock detection/prevention
  - Serious errors tolerance, such as no termination
- How to define the multi-agent hierarchy to optimize performance
- How to construct RUDDER in a P2P network
Bibliography