

Towards Automatic Composition of Network Management Web Services

1. Motivation

Network management currently requires a lot of manual interaction. Using Web services is a first step towards a better integration of business functions and technical management.

× Web services for management

- ▶ Possible base for (future) management architectures
- ▶ Can be enriched with semantic information
- ▶ Automatic composition of services possible

× Automate management

- ▶ Find and call Web services without knowing the details of the network
- ▶ Compose “Higher-Level Services” on demand

2. Web-Service Composition

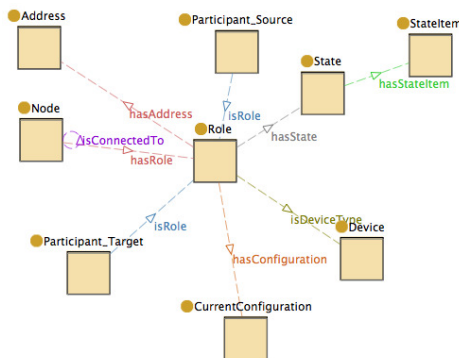
× Synthesis: The way a composition is created

- ▶ Manually
- ▶ Template-based
- ▶ Automatically

× Orchestration: Executing the composed service

× Composition tasks

- ▶ Discovery: Find Web services that fulfill the task
 - ▶ Registry: Semantic Support needed (e.g. OWL-S/UDDI-Matchmaker or OWLS-MX)
 - ▶ Matching: Compare IOPEs of task and services
- ▶ Negotiation: Agree on how a found service may be used
- ▶ Composition: Generate an execution plan
- ▶ Invocation: Execute the services



Excerpt of the system ontology

3. aNeMaC Framework

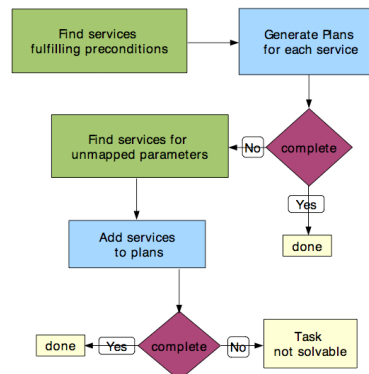
× Automatic Composition with OWL-S

× Simple Management Ontology

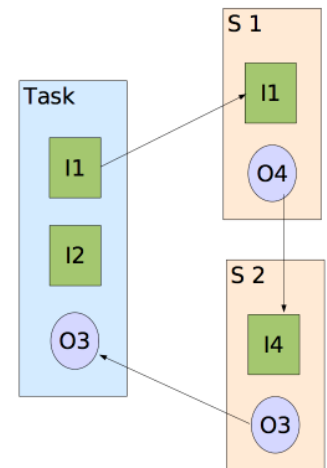
- ▶ System Ontology: Networks and devices
- ▶ Configuration Ontology: Device configurations
- ▶ Operations Ontology: Actions

× Architecture

- ▶ Management Core
- ▶ Planning Engine
- ▶ Web GUI
- ▶ Matchmaker



Plan Generation



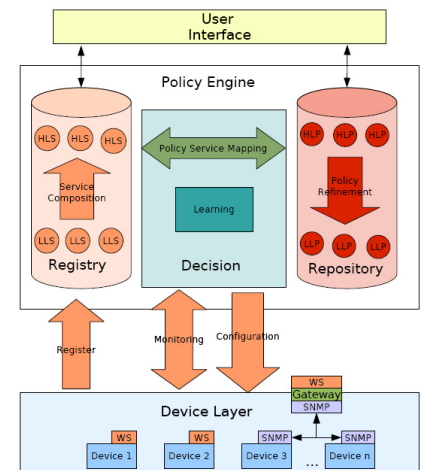
Parameter Mapping

4. Application

× Policy-based Management

- ▶ Used for Autonomic Communications
- ▶ Web services for device configuration/monitoring
- ▶ Policy refinement

- ▶ No general solution yet
- ▶ Web service composition can be used as a complementary technique



5. Future Work

- × Choose information model to replace the simple ontology
- × Develop policy service mapping
- × Implement and test the policy-based system in realistic large-scale case studies

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