OASiS: Programming Framework

Service Graph Metamodel and Constraints

Service Graph Metamodel

- One or more services connected by service connections
- Service constraints
  - associated with one or more services
  - defined as operations on properties of services

Service Graph Constraints

- Individual Constraints
  - Specify a constraint that applies only to a specific service
  - Specified by:
    - Property (power level, position, etc.),
    - Operator (≤, =, ≥, <, >),
    - Comparison Value (provided by user)
- Aggregate Constraints
  - Specify a constraint that must hold across several services
  - Specified by property, operator, and comparison value
  - Additional attribute:
    - Aggregate Type (sum, average, etc.)
- Provider Constraints
  - Specify that services must either run on the same node, or must all run on separate nodes

Service Discovery

- On-demand service discovery
- Broadcast service request message
- Service provider reply with relevant service information message
- Service constraints are resolved using discovered service information
- Service graph is instantiated at runtime

Example

Computational Operation Chain

Constraints:
- A.Power + B.Power + C.Power > MIN
- A.Provider ≠ B.Provider

Scenario #1

OASiS instantiates the service graph at runtime by selecting services among multiple service providers that satisfy the constraints

Scenario #2

OASiS dynamically reconfigures the service graph

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