TECHNISCHE UNIVERSITÄT DARMSTADT

ReFFlow

Reusable Flexible WS-flows

Databases and Distributed Systems Group

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ReFFlow Project

Motivation

- Missing specifications
  - Standard methodology for development and execution of Web Service compositions
  - Unified WS compositions model
- Inadequate support for WS-flow adaptability
- Lack of execution engine and supporting tools for WS-flows with built-in adaptability

Procedure for Development and Execution of Process-based Composite Web Services

- Based on WS-flow life-cycle
  - Phases prescribe approaches to address different aspects of a process definition
  - Standardized approach to WS-flow development and execution
- Promotes
  - The creation of unified WS-flows meta-model with built-in adaptability
  - Automation of WS-flows development using templates

Meta-Model:

- Extends existing models
- Constructs:
  - Dynamic selection and invocation of WS instances
  - Dynamic changes of process schema
    - WS types
    - Process logic
  - Selection policies
  - QoS parameters
  - Independent of implementation approach
  - Promote WS-flow standardization and portability

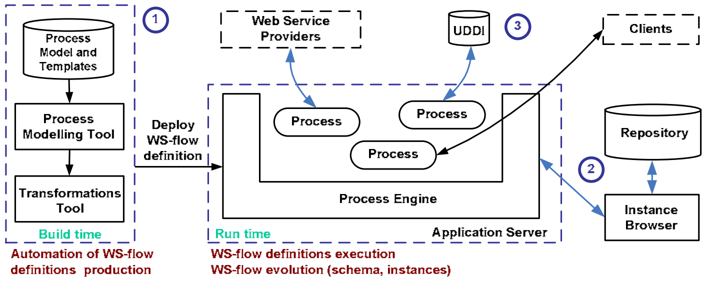
Build time

- Development automation
- Based on common WS-flow model
- Reuse of process definitions

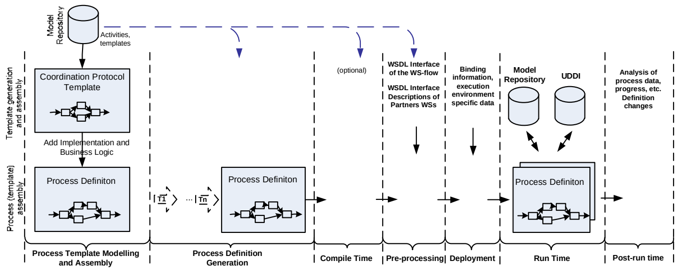
Run time

- Desired features:
  - Process adaptability and flexibility
- Users control the adaptation of processes
- Details of the implementation approach remains hidden (transparent)

Platform



Methodology


Model Repository
Activities, templates
Template generation and assembly
Process (template) assembly
Coordination Protocol Template
Add Implementation and Business Logic
Process Definiton
T1
Tn
Process Definiton
(optional)
WSDL Interface of the WS-flow
WSDL Interface Descriptions of Partners WSs
Binding information, execution environment specific data
Model Repository
UDDI
Process Definiton
Analysis of process data, progress, etc. Definition changes
Process Template Modelling and Assembly
Process Definition Generation
Compile Time
Pre-processing
Deployment
Run Time
Post-run time

Process template modeling and assembly

- Model and assemble templates and parameterized processes
  - WS-flow templates: design patterns, domain-specific templates, coordination protocols roles
- Use meta-model constructs
- Produce abstract process definitions
  - Avoid any references to specific WS instances and to WSs portTypes
- Add additional business logic

Process definition generation phase

- Transform the templates and parameterized processes into executable process definitions
- Use traditional meta-programming techniques
  - Code generators, transformations of XML documents

Compile and pre-processing time

- Optional - depend on the target definition language

Deployment

- Enrich WS-flow definitions with
  - Execution environment specific data
  - Details about the participating WSs
  - Binding information of WS-flow

Execution time

- Process instances are created and executed
- Adaptability (flexibility) supported by the system catalogue of the process engine and the extension activities

Post-run time

- Analyze the process progress and logic
- Use information gathered during run time
- Change process schema accordingly

Future Work

Tools

- WS-flows templates and model repository
- Process modelling tool
- Support coordination protocols
- Transform definitions into multiple languages
- Instance browser

Engine Implementation

- Model extension constructs for built-in flexibility