



# An Aspect-oriented Workflow System for Grid Services

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## Introduction

- Grid computing has been gaining importance
- Traditional application domain: science
- Recent challenge: use of grid technology beyond science, for production and design in industrial settings
- Since 2002: standardization effort for grid (OGSA)
- New standard: grid services, based on web services
- Services standardized, but composition still open issue
- Services mostly composed using general-purpose languages
- Workflow languages (e.g. WS-BPEL) are better suited

## Problem Statement

- No workflow languages tailored for grid services
- Problems with workflow languages for web services:
  - Expressive but complicated
  - Not suited for high-performance computing
  - Insufficient support for separation of concerns
  - Insufficient support for dynamic workflow adaptation
- Goal of research: design and implement workflow system specifically aimed at grid services

## Approach

- Design new workflow system, focusing on:
  - Modularization
    - of crosscutting concerns (using AOSD)
    - of non-crosscutting concerns (using subprocesses)
  - Dynamism
  - High-performance computing
  - Semantics
- Implement proof-of-concept
- Validate workflow system (i.c.w. industrial partner)
- Generalize results (e.g. to web services)

## AO Properties

- Joinpoint model:
  - Basic workflow activities (e.g. invocations, assignments), i.e. not only points of interaction
- Pointcut language:
  - Selection based on properties of workflow activities
- Advice language:
  - Advices expressed using basic workflow language
- Aspect modules:
  - Similar to subprocesses
- Aspect composition:
  - All relations between aspects must be specified in advance

