

SSEI Research Task Summary – T16

Task Number: SSEI/T16

Lead Delivery Organisation : Newcastle University

Project Title : Interface Contracts for Architectural Specification and Assessment

Research Theme : *Software Systems Architectures*

Version : 2



Objective of Work (why are we doing it ?)

Software dependent systems are increasingly component-based, with an architecture than can be characterised as “systems of systems” (SoS). Such architectures help to provide a responsive and flexible system, but at the cost of increased complexity due to the lack of central authority and coordination. This complexity affects our ability to predict emergent system-level properties including those related to safety and security, putting the system integration phase at increased risk of cost and time overruns.

An investigation of the benefits that can be gained from formal expression and analysis of interface contracts will help to advance practice in design-time analysis of emergent properties.

Nature of Work (what is it?)

The work will establish the current capability for expressing and exploiting contracts in industry-strength architectural description frameworks such as the MOD Architecture Framework (MODAF) and the Architecture Analysis & Design Language (AADL), and explore the benefits that can realistically be gained from formal expression and analysis of contracts. Building on rely-guarantee contract languages, a basic contract interface language for functional and non-functional properties will be developed. The language will be evaluated using a Service-Oriented Architecture (SOA) based, proof of concept study.

Finally a roadmapping activity will identify the research and development directions that should be taken to advance best practice.

Outcomes (what will it produce/has it produced ?)

The task will produce four outputs:

- Survey and evaluation of architectural frameworks supporting contract-based specification, including MODAF and AADL
- A basic contract-based interface specification language definition with semantics and worked examples.
- Proof of concept study: application and evaluation report
- Roadmap report

Timescales 24 month task, January 2010 to December 2011

Partners

Related Work SSEI/T10

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