On Temporal Abstractions of Web Service Protocols

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Introduction

- Web services are increasingly gaining acceptance as a framework for facilitating application-to-application interactions within and across enterprises.
- Tools supporting service development today provide little support for high level modeling and analysis of abstractions at higher level of services stack.
- When developing our framework for service protocols modeling, analysis, and management, we identified the need for representing temporal abstractions in protocol descriptions.

Modeling temporal abstractions in business protocols

- Timed business protocols are deterministic finite state machines.
- Two kinds of temporal abstractions:
  - must-involve: implicit transitions
  - can-involve: explicit transitions
- Formal semantics based on timed traces.

Compatibility and replaceability in timed protocols

Protocol management operators can be identified to perform the following type of analysis.

1. Compatibility analysis: when can two services interact correctly?
2. Replaceability analysis: when can a given service replace another one?

Our approach

- Compatibility / replaceability classes:
  - partial timed compatibility / replaceability
  - full timed compatibility / replaceability
  - timed replaceability with respect to a client protocol.
- Operators for analysis and management:
  - parallel composition
  - intersection
  - difference.

⇒ Toward a framework and a CASE tool for protocol analysis and management.