

Motivation

The Web Service Architecture targets the development of applications based on the XML standard, which eases the construction of distributed systems by enabling the dynamic integration of applications distributed over the Internet, independent of their underlying platforms. However, there is a number of research challenges in supporting the thorough development of distributed systems based on Web Services. One such challenge relates to using Web Services in developing business processes, which requires support for composing Web Services in a way that guarantees dependability of the resulting composed services. This calls for developing new architectural principles of building such composed systems, in general, and for studying specialized connectors gluing Web Services, in particular, so that the resulting composition can deal with failures occurring at the level of the individual service components by allowing co-operative failure handling.

Solutions that are being investigated towards supporting dependable composition of Web Services subdivide into the definition of XML-based languages for specifying service composition, and revisiting transactional support to cope with the specifics of Web Services (e.g., crossing administrative domains, Web latency), i.e., defining connectors offering transactional properties over the Internet. However, while the transaction concept offers a powerful abstraction to deal with the occurrence of failures in closed systems, it imposes too strong constraints over component systems in open environments such as web Services, the main constraint relating to support for backward recovery.

Research

Our research in the area aimed at supporting the dependable composition of Web services, based on forward error recovery. This enables dealing with dependability of composed Web Services without any impact on the autonomy of Web Services, while allowing the exploitation of their possible support for dependability. Our approach lies in system structuring in terms of co-operative actions that have a well-defined behavior in the absence and in the presence of failures.

We have more specifically investigated the following issues towards supporting dependable composition of Web Services:

- XML-based specification of Web Services composition, including behavior of the composed services in the presence of failures based on exception handling.
- Formal specification of Web Service composition to allow reasoning about their behavioral properties, both in the absence and in the presence of failures.
- Automatic generation of composed services from their specification and run-time support for co-operative actions, including supporting protective wrapping to detect erroneous behavior of individual Web Services.
- Caching and prefetching strategies for composed Web Services for the sake of response time improvement.

Contributors

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Supporting Grants

- [DSoS](#) -- FP5 IST - Dependable Systems of Systems
- [CorSS](#) -- ACI - Composition and Refinement of Dependable Systems

Follow-up

- [Maintenance of service-oriented software](#)

Publications

- Titre [Composition Sûre de Fonctionnement de Services Web](#) Auteurs Tartanoglu Ferda
Détail Thèse : Université Pierre et Marie Curie - Paris VI (09/12/2005) Accès au texte intégral
- Titre [Specifying Web Service Recovery Support with Conversations](#) Auteurs Tartanoglu
Ferda; Issarny Valérie Détailln
38th Hawaii International Conference on System Sciences : HICSS 2005
(2005) Accès au texte intégral
- Titre [Coordinated Forward Error Recovery for Composite Web Services](#) Auteurs Tartanoglu
Ferda; Issarny Valérie; Romanovsky Alexander B.; Lévy Nicole Détailln
22nd Symposium on Reliable Distributed Systems : SRDS 2003
(2003) 167-176 Accès au texte intégral