Dynamic Selection of Redundant Web Services

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Introduction

- Web Services evolve from the Service-Oriented Architecture paradigm;
- Web Services are loosely-coupled, distributed components;
- Web Services are platform- and programming language independent;
- Web Services are described by Web Service Definition Language (WSDL) in XML format;
- Web Services message exchange is based on Simple Object Access Protocol (SOAP).

- Web Services Conceptual Model:

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Problem Definition

- By nature, the domain of Web Services consists of redundant services:

- How to manage redundant Web Services on the server side in order to achieve:
  - Transparent selection;
  - Dynamic selection.
  - What selection techniques should be applied?

Introduction

- Issues:
  - Do the other researchers focus on dynamic service selection? – Yes.
  - Is the service selection transparent to the clients? – No. Usually, the clients are involved in the service selection.
  - How is the service selection realized? – QoS computation and ranking; Expert systems and service evaluation functions; Agents/Mobile agents; Virtualization of services and monitoring.
  - What is missing? – A flexible architecture that provides transparent and dynamic selection of redundant Web Services.

Related Work

- Characteristics of the Virtual Web Services Layer:
  - Dynamic service selection and invocation;
  - Transparent service selection and invocation;
  - Flexibility:
    - New functionality can be added to the system at run-time;
    - Different selection strategies can be applied.

Proposed Approach

- Virtual Web Services Layer (VWSL):

- Evaluation

- Conclusions

Experiments Results

- The accuracy of the QoS of the Web Services is crucial for the Virtual Web Services Layer;
- When the accuracy is low, selection techniques which take into account less QoS criteria should be applied;
- When the accuracy is high:
  - The load balancing technique and the more accurate selection assure minimum overloading;
  - The load balancing technique assures the lowest system’s execution time;
  - All selection techniques which consider QoS criteria, assure a high level of dependability.

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