International Journal of Computer Network and Security(IJCNS)
Vol 4. No 1. Jan-Mar 2012 ISSN: 0975-8283
www.ijcns.com

Optimized Service Level Agreement Negotiation System for Web Services: Case Study

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Abstract

A service-level agreement (SLA) is a negotiated agreement between two parties in SOA.SLA records a common understanding about services, priorities, responsibilities, guarantees, and warranties. Each area of service scope should have the "level of service" defined. Automated negotiation can play an important role in SLA management by enhancing the reliability and user satisfaction on service-oriented computing. During the negotiation process, the adaptive algorithm is applied to update the parameters of negotiation strategy in order to generate more effective counter offers based on the opponent's offer values, and to accommodate policy updates from the concerned party to account for resource availability or updates in business policies. Existing methodologies performed the Bilateral bargaining Negotiation concept for services. It takes more time and less efficiency and is not support the scalability and QoS for multiple services. To overcome this paper analyse a case study for Multilateral Negotiation approach to avoid the pitfalls of Bilateral Negotiation approach. If multiple service providers offer similar services, a multilateral negotiation can be very effective in finding the best service in the shortest time. This process can be defined with the Fuzzy based decision rules and finally the selected service is selected with the SLA ranking.

Key Terms: Multilateral Negotiation System(MNS),Fuzzy Rule based Decision (FRD), SLA Ranking (SLR),and Negotiation Broker service.

1. INTRODUCTION

The effective uses of web services to compose business processes in service computing expect the Quality of services meet customer expectation or requirements. The service level agreement (SLA) can help define the Quality of services requirements of critical service computing process.

In literature survey existing methodology provide bilateral negotiation approach which means at a single time only two service providersare able to compare to find the best service provider. This process will take more time to compare the service provider and it support low efficiency.

To overcome the issues this paper analyse a case study for Multilateral Negotiation framework.Itperforms Multi-lateral bargaining of SLA of multiple service providers and service consumers. Fuzzy rule based decision rules are used to define theNegotiation process. Negotiation process uses intelligent agents to use time based decision function. Finally the results should be compared the total utility value of the negotiating parties and it ranked with the SLA ranking and given to the customer. To increase number of mapping models compare to existing system by using time based decision function.

2. RELATED WORK

Fuzzy logic rule applied during the process of multi lateral negotiation approach to find the best web service provider.In proposed work initially presented a policy model using WS-Policy specifications for expressing negotiation preferences for SLAs at the business level. We also presented a basic mathematical policy-mapping model. In the analysed trusted NB frame work provide the provisioning negotiation services in a Service-Oriented Architecture (SOA). The NB used intelligent agents and the exponential time-based function to autonomously execute bilateral bargains within the framework.

"Farhana H. Zulkernine and Patrick Martin" [1]: The author propose a novel trusted Negotiation Broker (NB) framework that performs adaptive and intelligent bilateral bargaining of SLAs between a service provider and a service consumer based on each party's high level business requirements. The mathematical models are used to map business-level requirements to low-level parameters of the decision function, which obscures the complexity of the system from the parties. They also define an algorithm for adapting the decision functions during an ongoing negotiation to comply with an opponent's offers or with updated consumer preferences. The NB uses intelligent agents to conduct the negotiation locally by selecting the most appropriate time-based decision functions. The negotiation outcomes are validated by extensive experimental study for Exponential, Polynomial, and Sigmoid time-based decision functions using simulations on our prototype framework. Results are compared in terms of a total utility value of the negotiating parties to demonstrate the efficiency of our proposed approach.

"M. Comuzzi and B. Pernici"[2]: This article proposes a framework for the automation of the Web service contract specification and establishment. Theydescribe a matchmaking algorithm for the ranking of

functionally equivalent services, which orders services on the basis of their ability to fulfil the service requestor requirements, while maintaining the price below a specified budget. They also provide an algorithm for the configuration of the negotiable part of the QoS Service-Level Agreement (SLA), which is used to configure the agreement with the top-ranked service identified in the matchmaking phase. Experimental results show that, in a utility theory perspective, the contract establishment phase leads to efficient outcomes.

RAMOND Y, Li, Dawei song [3]: The researchers propose intelligent software agents are promising in improving the effectiveness of e-marketplaces for e-commerce. Although a large amount of research has been conducted to develop negotiation protocols and mechanisms for e-marketplaces, existing negotiation mechanisms are weak in dealing with complex and dynamic negotiation spaces often found in e-commerce. They illustrate a novel knowledge discovery method and a probabilistic negotiation decision making mechanism to improve the performance of negotiation agents. Our preliminary experiments show that the probabilistic negotiation agents empowered by knowledge discovery mechanisms are more effective and efficient than the Pareto optimal negotiation agents in simulated e-marketplaces.

H. Li, S. Su, and H. Lam [4]: The automation of negotiation requires a decision model to capture the negotiation knowledge of policymakers and negotiation experts so that the decision-making process can be carried out automatically. Current research on automated e-business negotiations has focused on defining low-level tactics so that automated negotiation systems can carry out automated negotiation processes. These Low-level tactics are usually defined from a technical perspective, not from a business Perspective. There is a gap between high-level business negotiation goals and low-level Tactics. In this article, they distinguish the concepts of negotiation context, negotiation goals, negotiation strategy, and negotiation tactics and introduce a formal decision model to show the relations among these concepts. They show how high-level negotiation goals can be formally mapped to low-level tactics that can be used to affect the behaviour of a negotiation system during the negotiation process.

C. Cappiello, M. Comuzzi, and P. Plebani [5]: Before a service invocation takes place, an agreement between the service provider and the service user might be required. Such an agreement is the result of a negotiation process between the two parties and defines how the service invocation has to occur. Considering the Service Oriented Computing paradigm, the relationship among providers and users is extremely loose. Traditional agreements are likely to concern long term relationships and to be manually performed. In this paper, they propose a model to generate service level agreement on-the-fly. Just before the invocation commences, the quality of the service is negotiated in order to generate a service level agreement tied to that specific invocation. Such an approach relies on a quality model that supports both users requirements and providers capabilities definition.

3. PROBLEM STATEMENT

The Multilateral Negotiation approach means generally call simultaneously, three or more parties'aims at an agreement acceptable to all participants. In this paper analyses the Multilateral Negotiation approach process overcome the some more than Issues Occurring such as Low Scalability, need more time, less efficiency during the existing System Process. Existing system done only bilateral negotiation approach it's mean at the Time Compare two service providers only for to finding the best service provider.

In the Multilateral Negotiation approach compare three are more providers at the time for finding the best service provider. The combination of the bilateral negotiation approach and Multilateral Negotiation approach. The aim of the comparison the Multi-lateral Negotiation approach is to show superior and powerful performance.

The key aspects of this work will be in

- An improved set of mapping equations.
- To make fuzzy rule based decision making function.
- Ranking the web services for select the best service.
- Then generate the SLA report between service provider and consumer.

The Multilateral Negotiation approach is the best method for to finding the best web serviceprovider from multiple providers with shortest time based on consumer policy Requirements and specifications. The comparison factors such as Non-functional parametersQos, Number of users, cost, time etc. The results are compared based on utility values of the negotiation outcomes.

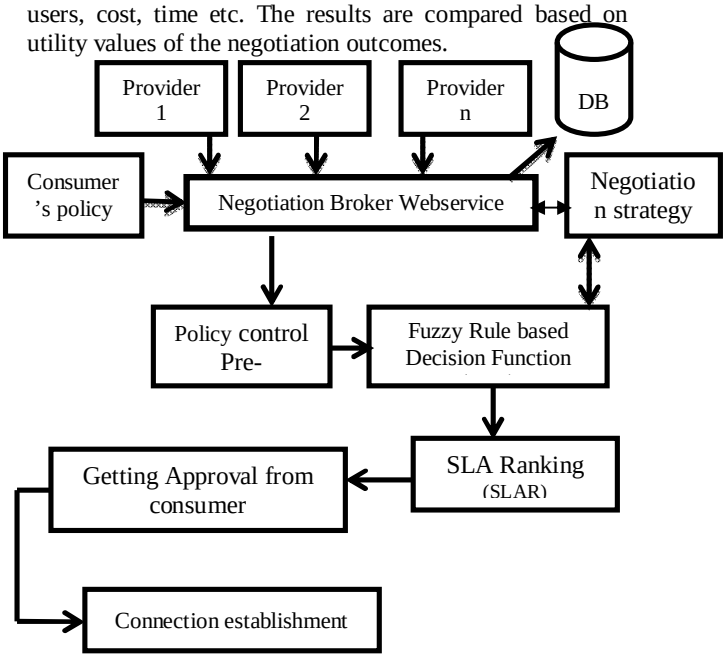

Figure.1. Multilateral Negotiation System (MNS)

4. MULTILATERAL NEGOTIATION SYSTEM FRAMEWORK (MNS)

In our methodology that invokes the weighted average method to compare the file retrieval from the browsers. Our approach is to reduce the searching time and provide the quality of service. Inputs of this system are in searching term. That provides the link to the browsers and our application. In the existing application the searching term sends to the browsers browser invoke to the brokers to providing web service and shows the result. Collection of results depends of the SLA.

In this approach provides the bi literal retrieval. Calculate the processing and average waiting time for each browser activity. The number of browser invoked at the same time and compares their activity. It is a complex process.

Each and every action of the web brokers should be monitored. To list out what kind of the service they will be need and to be provided. Compare the activity for each and every agreement and providers. This system gets the file retrieval time and size of the file that will be returned. Here to consider the various factors for negotiation.

Time and size limit to be considered for filtering. Negation process is depends the needs of the user. We provide the accurate time difference for the processing. To compare the negation conditions. In this two modules check the internet services and monitored the activities of Object Request Brokers.

A. Policy Specification Model

A service consumer can request a negotiation service from the NB by providing its own policy and the Provider's context in the policy specification under Negotiation Context.

B. Decision Support System

Fuzzy Rule and Time based decision functions are used to take necessary decision for list out the best services that satisfies the consumer specification.

C. Report Generation

The outcome of the Negotiation process based on the results obtained, Service level Agreement generated and delivered to Consumer.

5. CONCLUSION AND FUTURE WORK

Average waiting time is high in the bi-literal approach in the negotiation method. Browsers retrieve the files from the web services. They need fuzzy logic decision support system for further processing. Decision support is a manual process. We need to improve the quality of service.

In future work, it is planned to automate the process, so that offline experiments will detect these values and store them in the NegKB for different numbers of issues. The negotiation policy model includes goal, context, constraints, and other rules. Next to implement context or goal-based negotiation using rule engines to dynamically adapt the policy according to the context of the opponent. Using context-based negotiation, they can be extend the applicability of our framework to areas like cloud computing.

Multiple service providers invoke in this Negotiation system some more chance to occur security issues during negotiation process like avoiding security problems. The NB is a trusted broker middleware because the negotiating parties have to confide their business policies with the NB to outsource the task of SLA negotiation. Trusted models with the NB to establish better trust relationships can also be implemented in future.

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