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A Comprehensive Infrastructure of Constraint Optimizer in Dynamic Web Service Composition

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Abstract: Important dimension of web service technology is composing different web services and selecting optimized web services automatically according to the need of customer and supplier. Automatic selection of best services for satisfying the need of customer and supplier for composing web services, require compute criterion, cost estimation module, constraint optimizer and ontology. This paper represents all principles that leads to constraint based selection and preferring best set of web services to suit the demands of customer and suppliers. In future this research will gracefully support semantic web and semantic web services process. The feasible composition of web services is categorized and best services are selected. The fundamental idea of web services composition and select optimal services will surely reduce man power. In this paper multi phased approach for selecting optimal web services has been used. The main objective of web services composition research is improving the efficiency of web services by selecting optimal and feasible web services from available web services at particular time and reduces time and complexity during composition and execution of web services.

Keywords: Dynamic Web Service Composition, Constraint Optimizer, Cost Estimation Module, Ontology, Web Service Search Engine

1. INTRODUCTION

Now a day at speedy rate development of internet a huge number of web services have been merged. Currently World Wide Web is growing into a various computational devices from a collection of various information resources (Guobing Zou, 2009). For achieving new and supplementary valuable solutions of web services, the essential need of composing current web services into very complicated web services has been increased. Therefore realizing these objectives collection of web services and interacting with each other is essential. At present consumers are consuming only those services which already they know or search new services by key based search engine like google. Various consumer search web services from private web service registry like Universal Description Discovery Integration (UDDI) (Huimin He and He 2008). The heterogeneous and collaborating web service process is referred dynamic or static. During the process of design the web service are fixed in static web service composition. In design process of the web services each activity in dynamic composition is determined at run time. The run time discovering of web service registries for searching web services is concerned in dynamic process of web service composition. It is a promising technology of the preference for constructing web application across the organization. Presently BPEL4WS (Benayed, 2011), BPML Rajesh and Thiagarajanv2002), and OWL-S (Vincent Hilaire, 2010) are considered for constructing web process for utilizing web service compositions. Various advantages are offered by web service composition from a business perspective such as guarantying decrease business risk as reusing current web service and minimize the required work for developing new web applications. Increasing automation in web service composition and properly managing web process semantics has been proposed. In this paper with the help of using ontologies two educational approaches like OWL-S and WSMF have make an effort to come within the reach of that result to portray web services. These approaches are reliable with the inspirations of the semantic web. The semantic web makes efforts to add superior meaning through ontologies to the entire entity on the web. For creating automatic web services process, available web services and enough machine process able information have been predicated. Thus the process requirements and semantic annotation are required to specify a high level web service. Such requirements are identified as application logic, goals or create hierarchal arrangement. Still all above approaches for composing web services automatically have not considered a complete infrastructure for composition. All above approaches for web service composition have optimized selection of web services in existence of web service dependencies on the basis of particular quality

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of service. The fundamental step for the achievement of web service-oriented architecture (Matthias Galster, 2013) is dynamically selecting web services. The efforts of quality driven web service composition (Georgiana Stegaru, 2012) is a nearer to our approach. In quality driven web service composition linear programming approach and QOS parameters have been proposed for choosing web service. In this way they have only focus on general issues of quality of service and optimization. However in constraint optimizer ontology based web service composition approach comprehensive infrastructure has been provided. In this approach selecting optimal web service is based on multi dimensional principles like quality of service, process constraint and cost estimation.

The main objective of web services composition (Daewook Lee, 2011) research is improving the efficiency of web services by selecting optimal feasible web services from available web services at particular time and reduce time and complexity during composition and execution of web services.

The paper is structured as follows: in the following section Material and Method has been described. Section 3 give more detail about an architecture of constraint optimizer ontology based web service composition.. Finally in section 4, conclusions and future work has been described.

2. MATERIAL AND METHOD

It is a capability of web service composition that one business company offered value added web services to various business companies by composing existing web services. Web services composition officers end to end an integration of web services in a dynamic manner with each other. The interaction of web services and combined teamwork would be provided by web service composition. The web service developers are proficient to utilize huge number of web services which are supplied by a variety of parties to deliver integrated and more dominant industry way outs. Vehicle manufacture motivating scenario has been presented in this section. In this scenario producer of vehicle has received a large order of manufacturing cars. For completing this order vehicle producer must purchase vehicle parts from various suppliers. The producer of vehicles would like to join together various suppliers in their process and wants to select best supplier dynamically on quotation base.

In **(Fig. 1)** overall logical steps are described via flow charts. The process starts with receiving customer orders which are then processed for selecting feasible suppliers. In the flow chart feasible suppliers have been contacted for quotes and on the basis of quotation the best supplier would be selected. Finally order has been sent to that supplier and received confirmation is received

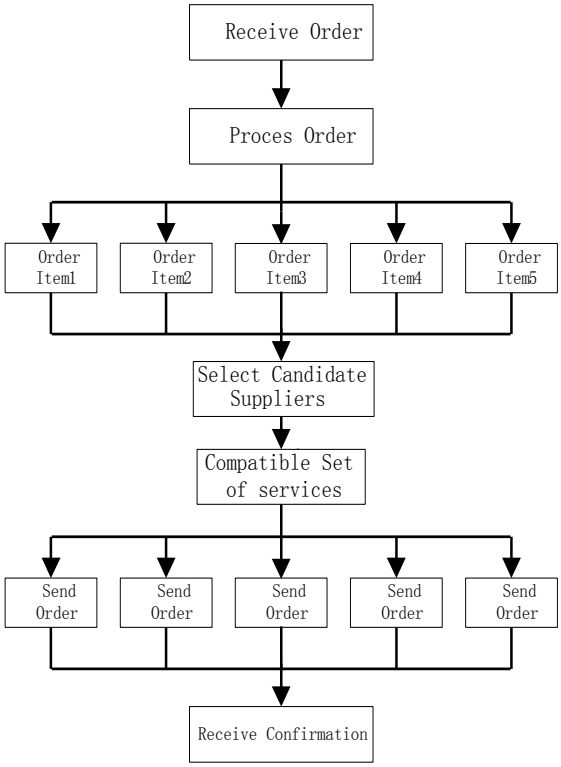


Fig. 1. Constraint based order for selecting optimal service

In this scenario, designer will decide that which services would be combined automatically with architecture of constraint optimizer ontology based web service composition and which services would be combined manually. For choosing the supplier and processing the order for purchasing vehicle parts internal service distributor will remain same therefore the process might be bound statically. Making contact with suppliers will depend on the basis of clients order. In this scenario supplier service should be combined dynamically in the composition process by indicating service patterns.

3. A PROPOSED INFRASTRUCTURE OF CONSTRAINT OPTIMIZER IN DYNAMIC WEB SERVICE COMPOSITION

In **(Fig. 2)** the service templates are used to represent the functionality of the proposed infrastructure of constraint optimizer in dynamic web service composition. The most significant units of the proposed Infrastructure are OWL-S web service registries, web service search Engine and last unit is constraint optimizer which contain constraint analyzer unit, cost estimation unit and constraint representation.

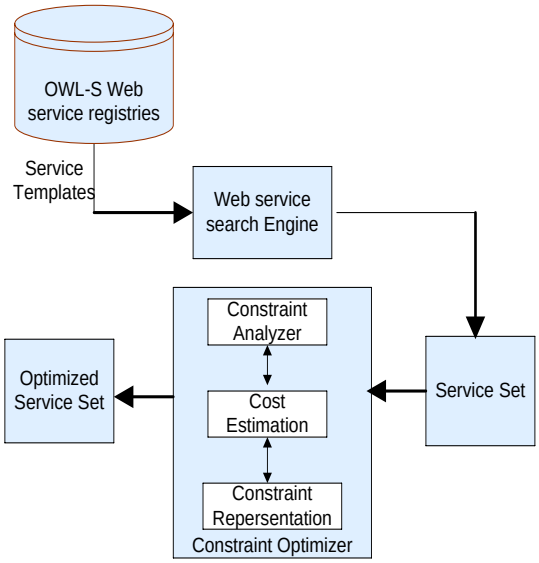


Fig. 2. A Proposed Infrastructure of constraint Optimizer in Dynamic Web service Composition

3.1. OWL-S web service registries.

Web service registry is a discoverable registry of web service description. In Web service registry web service description is published by web service producers and web service clients search web service from that registry. The OWl-S registries reduce discovery time and enhance efficiency and accuracy Of web services operations. The operations of web services have offered huge number of abilities to the reaming of all groups which are implemented by OWL-S. The capability of web services means information about travel agencies, stock exchange information and information about reservation systems etc. Mostly web services through information exchange resolve the dilemma with their ordinary procedures or completely exchange of web services.

3.2. The web service search engine

The web service search engine is an interface for providing information about semantic publishing and discovering web service with OWL-s registries. The web service search engine utilizes and compare ontological concepts and the class's subsumption-relation in the query which are specified in the OWL-s registry. Search engine is also engaged in corresponding cardinality, evaluating the concepts of properties, types of data and in ranking by various appropriate discovered web services. Returned searchable results by the various tools are categorized on the basis of reliability and quality of Service. For searching the web service information form OWL-S registry a simple query is employed by discovery engine. In web service engine, discovery procedure is principally based on restrictions advertised by the producer of web service and on ontology based semantic description. A query template in web service engine is used to create a simple query. Query identifies well-designed characteristic of the mandatory web service. The functional semantics like the operation action and operation name are specified in query templates. Furthermore query template contains location and domain exception, pre condition, post condition and input/output name. These quires are generated by users manually or by automatic tools from existing web services.

3.3. The web services constraint optimizer

The major function of web service constraint optimizer is to chose optimal web service and satisfy customer's requirement. Dynamically web services are selected by the web service constraint optimizer from candidate services. These selected web services are arrived by the web service search engine. The last unit of constraint analyzer is constraint optimizer which produces optimal ranked and near optimal web service on the basis of process constraint and business. Each activity or whole business process can be specified by various constraints. According to the objective function constraint optimizer give assurance that the searchable web services surely satisfy the customer's requirements and produce optimized set of web services.

3.3.1. The web service constraint representation unit

The web service constraint representation unit is a set of constraints and variables. The set of constraints and the variables permits consumers to characterize the production restriction in database and ontologies. The production restriction affects the web service selection for web process. For instance productions one part may be preferred by primary suppliers and other parts of the production may be preferred by secondary suppliers.

3.3.2. The web service cost estimation unit.

The major function of web service cost estimation unit is to retrieve the information for calculating approximately cost for different factors from web service constraint representation unit. These factors affect web service dependencies, selection of services, cost estimation, querying and process constraints. In selection of web service it is feasible that the individual web service depends on an additional web service. There are huge numbers of principles on which web service dependencies are based. For example partnerships, technological restrictions and production restrictions are principles.

3.3.3. The web service constraint analyzer

The user's specified constraints are accumulated in web service template. In this template

an operations can be specified by the service provider in the web service. This service can be invoked for obtaining the constraints of web service and quality of service metrics. The web service analyzer unit analyzes restriction for the web services that match with service templates. The matching services are retrieved from the OWL-S registry. According to the objective function constraint analyzer gives assurance that the retrieved web services surely satisfy the candidate's demands and generate optimized set of web services.

4. CONCLUSIONS

In this paper, we present a novel approach of constraint optimizer in dynamic web service composition. This work will support worldwide composition and optimization of various web processes. The major components of this system are Owl-s Registry, discovery engine, constraint optimizer, cost estimation module and constraint representation. The information which is stored in cost representation unit would be retrieved by the cost estimation component for estimating costs of service dependencies, process constraints and querying cost estimation. The great flexibility to compute various selection criteria has been added in this system by cost estimation and constraint optimizer unit. This research has concentrated on various problems of automatically composing web services from existing web services and selecting optimal services. In future confirmation of composition based on input, Pre condition, Post condition and output would be considered which gracefully support consumer in an interactive web service composition.

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