Asian Journal of Multidisciplinary Research (AJMR) 2017

E-ISSN: 2395-1710 P-ISSN: 2395-1729
Volume 03- Issue01 -, pp-01-08

Research Paper Open Access

A COMPARITIVE STUDY ON VARIOUS WEB SERVICE COMPOSITION METHODS

Manikandan.A [1], Dr. Danapaquiame.N[2], Balaji.V[3], Vigneshwaran.R[4],

PG Scholar [1], PG Scholar[2], PG Scholar [3], Associate Professor[4]
Department of Computer Science & Engineering,
Sri Manakula Vinayagar Engineering College-Puducherry
Maniraghu22@gmail.com[1], vbbalajir@gmail.com[2] , n.danapaquiame@gmail.com[3]

ABSTRACT

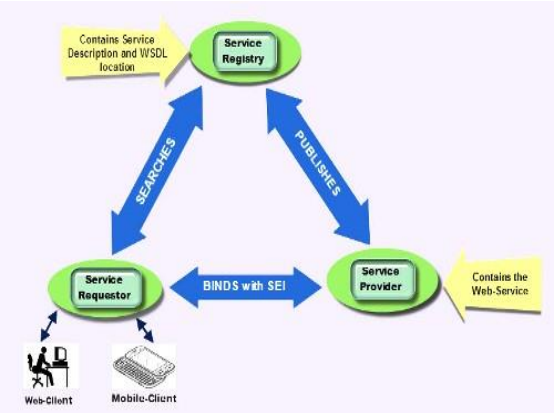
Web service composition is one of the most inspiring difficulties of recent years. The number of service providers is growing, and along with that for a request they provide multiple services with the same functionality, so it makes the problem of composition quite complex. Web Services are modular, self-describing, self-contained and loosely coupled applications that can be published, invoked, and located across the web. With the aggregated number of web services presented on the web, the need for web services composition is becoming more and more essential. The main objective of this survey paper is to analyze and study various web service composition methods and this paper will help the researchers to focus efforts and to deliver lasting solutions in this field.

Keywords: web service composition, composition methods

1. INTRODUCTION

Web service is a cheerful innovation that permits fabricating and trading free and self-governing programming. Benefit disclosure, benefit interface distribution and service conjuring are performed utilizing XML based guidelines, known as WSDL, UDDI and SOAP. The Web benefit demonstrate comprises of three elements, the service supplier, the service registry and the service purchaser. Fig.1 demonstrates a simple representation of web service model. By and large web service is a product segment that takes the information and produces the yield information. Web service are freely coupling that helps the designers to make, produce and create them at runtime, interfaces that characterize a gathering of operations that are system available by means of institutionalized web conventions and its components are depicted by utilizing a standard extensible Markup Language (XML)- based dialect. Be that as it may, Web Services are linguistically ordinarily and depicted with gauges, for example, Simple Object Access Protocol (SOAP), Web Service Description Language (WSDL) and Universal Description Discovery and Integration(UDDI)) .Web benefit

organization has gotten expanding consideration by the examination group in the previous couple of years.



The SOAP is a convention to trading organized data in a decentralized and disseminated environment. WSDL is a XML design for depicting the web service and just portrays the syntactic interface of web service that alone can't be utilized for programmed arrangement of web service. Subsequently, semantic standard conventions, for example, WSDL-S (Web Service Description Language-Semantic), WSMO (Web Service Modeling Ontology), OWL-S (Ontology Web Language - Service) and SAWSDL (Semantic Annotations for Web Service Description Language) have been produced for the programmed web benefit structure furthermore UDDI is a virtual registry that uncovered data about Web service. By and large, nuclear web administration isn't adequate to accomplishing complex needs of the client. Consequently, web service arrangement is proper answer for finding an ideal synthesis of web service to fulfill different client demands utilizing their syntactic or potentially semantic components

1. WEB SERVICE COMPOSITION

Web service composition includes the mix of various existing web service to create a more unpredictable and valuable service. The structure of web service is a theme that draws in light of a legitimate concern for scientists. It offers complex issues prepare capacity even with basic existing web service while coordinating with each other. Web service composition is a critical innovation of SOA that is in a perplexing and circulated environment and still there are numerous potential issues. One of principle focuses of Web service piece is reusing existing web service and making them into a procedure. Such projects empower client to physically indicate a structure of projects to play out an undertaking, yet it is now past the human ability to manage the entire procedure physically. In service the intricacy originates from the accompanying sources:

• First, the quantity of web service accessible on the Web is expanding drastically amid the late years and can hope to have a tremendous vault of web service for looking. Second, Web service can be made and overhauled on the fly, in this way the arrangement frameworks needs to recognize the upgrading at runtime.

• Third, Web service can be produced by various associations that utilization with various idea models for portrayal of the web service. Nonetheless, not exist interesting dialect to characterizing and assessment the Web services. The assortment of creation

systems can be arranged by methodologies. The first is syntactic creation in light of syntactic depiction and other is semantic structure in view of semantic portrayal. We will find in this area a few methodologies for web benefit arrangement in view of syntactic and web benefit creation in light of semantic and we will talk about their impediments with respect to its necessities. The in general, the creation of web service should be possible in a static or element route that in the accompanying is portrayed. Web benefit structure contains three strategies are: Manual/ Static Composition, Automatic/DynamicComposition,Semiauto matic/dynamic or static Composition. Manual/Static Composition is at syntactic gatherings.Programmed/DynamicCompositi on and Semi-programmed/dynamic/static Composition are at semantic gatherings. The administration structure comprises of four distinct models: work process based, manmade brainpower arranging based, semantic-based, and chart based.

• Manual/Static Composition

The static implies that the requester ought to assemble a conceptual procedure show before starting the piece; the theoretical procedure demonstrates incorporates an arrangement of undertakings and their information reliance. Every undertaking contains a question provision that is utilized to look the genuine nuclear web service to satisfy the errand. Two conceivable methodologies are right now explored for the static web benefit piece. The main approach, alluded to web service organization; this approach consolidates accessible web service with including a focal facilitator that is in charge of summoning and joining the single sub-exercises. The second approach, alluded to Web service choreography that does not accept the misuse of a focal facilitator, but rather it characterizes complex assignments by means of the meanings of the discussion that ought to be embraced by every member. In static synthesis, the total of the service is done at plan time and piece is performed physically implies that every web administration is executed one by one with a specific end goal to accomplish the sought objective/pre-requisite. This kind of arrangement is not will be not adaptable. There are numerous proposed manual web benefit synthesis strategies. These manual methods are normally utilized for planning business forms as a part of work process service frameworks. Additionally extraordinary dialects (e.g. BPEL4WS) are proposed for indicating organization. In any case, as it might appear, these strategies are only usable by programming engineers, not by end clients. As it were, manual synthesis of web service needs some programming encounters. To make benefits by work compel, customarily there are two unmistakable outline approaches: top down and base up. Base up is that, at initially, the potential accomplice WSs is recognized (they are concrete executable service) and afterward them is associated with particular process rationale. Another, top-down outline, is totally extraordinary. It begins from determining business handle (work process) comprised of dynamic non-executable exercises and along these lines, picking a fittest solid administration for every action. As a deadly disadvantage,

manual piece moderately requests for much higher cost. Along these lines, at present an expansive extent of research endeavors are devoted to computerizations rather than exorbitant and time-devoured manual creation that is attempting to completely kill human intercession. The exploration worries of programmed organization are different specialized perspectives in regards to how to consequently and effectively produce composite service that precisely meet the desires of requesters. Today, a ton of procedures are proposed for manual service synthesis (e.g. work process administration frameworks). Be that as it may, making composite service physically is hard and tedious assignment for the client.

• Automatic/Dynamic Composition

The dynamic arrangement makes handle demonstrate and chooses nuclear service naturally and requires the requester to determine a few imperatives including the reliance of nuclear, the client's inclination et cetera. Since, Manual web benefit structure is tedious and hard assignment, the programmed or PC supported (self-loader) arrangement of web service is a late pattern. Likewise the requirement for programmed piece of web with the expanding number of web service accessible on the web is turned out to be increasingly important. The automation means that either the technique can produce the procedure demonstrate naturally or the strategy can find the right service if a theoretical procedure display. For programmed web benefit synthesis, Semantic web is proposed. Cosmology is utilized to give all around characterized intending to the semantic web. Semantic web benefit arrangement is an element that enhances the adaptability of the framework. A programmed web benefit author ought to create "right" service in a synthesis as per the client's particular. The capacity of programmed structure of web administration for making another composite web administration is one of the key components for the eventual fate of the semantic web. Besides, composite web service are alterable that their parts can be consequently chosen at run-time in view of particular solicitations. Generally programmed piece strategies are either interface based or usefulness based. In interface based arrangement, sources of info and yields through interfaces of clients acquires composite web service and after synthesis the sought results are accomplished. The disadvantage of it this is usefulness is not ensured, while in usefulness based creation, client gives the equation that clarifies rationale with interface data. The greater part of these techniques depend on Artificial Intelligence (AI) arranging .There are numerous issues in counterfeit consciousness that are fundamentally the same as the programmed web benefit piece: manmade brainpower arranging, programmed programming era, programmed work process era, sensible finding, and so forth . In programmed piece of web service specialists are utilized to choose a web administration that might be made out of different web service, however from client's perspective, it is considered as a nuclear administration.There are some effective strategies for programmed web benefit creation that the accompanying specified

1. RELATED WORKS

There has been a number of web service composition methods proposed by researchers. Some of the web service composition methods are reviewed as follows: **Tang *et al.* [1]** introduced a novel automatic Web service composition method based on logical inference of Horn clauses and Petri nets. They first transform a Web service composition problem into a logical inference problem of Horn clauses based on the forward-chaining algorithm. They then use the Petri net and its structural analysis techniques to obtain the composite service. Since there may be a large number of services in a service repository, and a huge number of rules may be generated consequently, the Petri net of a Horn clause set is very large. In order to reduce the composition time, they proposed a method to select the candidate clauses for the inference when a new query comes. Its weakness is that it must be executed after receiving user requirements, and cannot be executed beforehand and the optimization process cannot be executed before receiving user requirements.**Wu and Khoury [2]**proposed a tree-based search algorithm for Web service composition in a cloud computing platform. They first create a tree that represents all possible composition solutions according to user requirements, and then prune the illegal branches aiming to reduce response time and improve performance, and finally use a heuristic algorithm to search an optimal solution. This method has the disadvantage similar to that in [1] ie the optimization process cannot be executed before receiving user requirements.**Talantikite et al [3]** presented a model automatic for Web Services Discovery and its Composition. In order to understandable descriptions, Semantic Annotation is used for web service Discovery and composition. The proposed approach uses from an inter-connected network of semantic Web services describing in OWL-S using the similarity measure between concepts like pellet before any submitted request. Their proposed approach gives several composition types: serial, dependent parallel and independent parallel. The Semantic Network is explored in backward chaining and depth-first in a single pass. At the end, are obtained several composition plans that satisfy the request and only one optimal composition plan using QoS is returned to the requester.**Wang and Guttula et al [4]** presented a semi-automatic approach for web service composition that including both data mediation and service suggestion algorithms. This paper seeks to aid users trying to compose web services into a process by providing service suggestions. A graph IODAG (Input Output Directed Acyclic Graph) is defined to formalize an input/output schema of a Web service operation. Three data mediation algorithms leaf-based, structure-based and path based are developed to address data heterogeneities in process design. For adding semantic description into web services have used from Semantic Annotation for WSDL and XML Schema. This approach utilized various types of annotations and QoS. Finally they have developed a data mediation approach that tries to find automatically the optimal mappings between outputs and inputs. And finally came to the conclusion that path-based algorithm is best data mediation algorithm from other two algorithms. **Lee *et al.* [5]** proposed scalable and efficient Web service composition method based on a relational database.They also uses the service net as a basic data structure. The service net has two drawbacks. First, it does not consider the issue to facilitate service discovery. Second, it is time-consuming for service addition and deletion. The behavioral description-based Web Service Composition (WSC)problem deals with the

automatic construction of a coordinator web service that controls a set of web services to reach the goal states. Despite its importance and implications, very few studies exist on the computational complexities of the WSC problem.**D. Lee et al[6]** proposed a Tree-based search algorithm for web service composition in SaaS With the growing demand of cloud computing most companies are moving software to the cloud in form of web services. Web services are popular in terms of distributed technology that can successfully solve integration problems between heterogeneous systems. Web service composition is NP-hard problem and one of the most challenging problems in web services.**J. Kwon et al[7]** proposedRedundant-Free Web Services Composition Based on a Two-Phase Algorithm.In this paper they proposed a redundant-free web services composition search based on a two phase algorithm. In the forward phase, the candidate composition will be found efficiently by searching the Link Index. In the backward phase, redundant-free web services compositions are generated from the candidate composition by using the concepts of tokens.**D. Lee et al [8]** proposed a computational complexity of behavioral description-based web service composition.This behavioural description-based Web Service Composition (WSC) problem deals with the automatic construction of a coordinator web service that controls a set of web services to reach the goal states. Despite its importance and implications, very few studies exist on the computational complexities of the WSC problem.

TABLE

AUTHOR	**YEAR**	**METHODOLOGY USED**	**ISSUES**
Tang *et al*	2013	A novel automatic Web service composition method based on logical inference of Horn clauses and Petri nets.	. Its weakness is that it must be executed after receiving user requirements, and cannot be executed beforehand and the optimization process cannot be executed before receiving user requirements.
Wu and Khoury	2012	A tree-based search algorithm for Web service composition in a cloud computing platform.	The optimization process cannot be executed before receiving user requirements.
	2008	A model automatic for Web Services	Have limitations of inefficiency and

Talantikite et al		Discovery and its Composition.	including redundant web services in the results.
Wang and Guttula et al	2011	A semi-automatic approach for web service composition that including both data mediation and service suggestion algorithms	Difficult to organize and manage services effectively
Lee *et al*.	2008	A scalable and efficient Web service composition method based on a relational database.	Very few studies exist on the computational complexities of the WSC problem.
D. Lee et al	2011	a Tree-based search algorithm for web service composition in SaaS	In tree searching ranking may be false data.
J. Kwon et al	2008	Redundant-Free Web Services Composition Based on a Two-Phase Algorithm	Have limitations of inefficiency and including redundant web services in the results.
D. Lee et	2011	Acomputational complexity of behavioral description-based web service composition.	Keywords for describing input and output parameters of one service may be different from another.

Discussion and Future Direction

Though there are many web service composition methods and many approaches to expedite web service composition methods are available, still there exist some of the laggings which must be overcome in future. Table 1 shows the comparison of various web service composition methods available in web service. From the survey, we come to conclusion that it is necessary to mitigate redundancy in web services and research has to be done to expedite web service composition method more efficiently.

Conclusion

Web service composition includes the combination of distinct existing web service to create a more unpredictable and valuable service. This survey helps the researchers to analyze and study different web service composition methods and it provides the future direction which includes some of the issues that must be mitigated by proposing an efficient method that helps to expedite the web service composition method efficiently than the existing methods and to avoid redundancy**.**

References

[1] Y. Wu, C. Yan, Z. Ding, G. Liu, P. Wang, C. Jiang, et al., "A Novel Method for Calculating Service Reputation," IEEE Transactions on Automation Science and Engineering, vol. 10, pp. 634-642, 2013.

[2] C.-S. Wu and I. Khoury, "Tree-based Search Algorithm for Web Service Composition in SaaS," in Proc. the Ninth International Conference on Information Technology: New Generations (ITNG), 2012, pp. 132-138.

[4]S. N. Han, G. M. Lee, and N. Crespi, "Semantic Context-Aware Service Composition for Building Automation System," Industrial Informatics, IEEE Transactions on, vol. 10, pp. 752-761, 2014.

[5] S. C. Oh, D. Lee, and S. R. Kumara, "Effective Web Service Composition in Diverse and Large-Scale Service Networks," IEEE Transactions on Services Computing, vol. 1, pp. 15-32, 2008.

[6] D. Lee, J. Kwon, S. Lee, S. Park, and B. Hong, "Scalable and efficient web services composition based on a relational database," Journal of Systems and Software, vol. 84, pp. 2139-2155, Dec. 2011.

[7] J. Kwon, H. Kim, D. Lee, and S. Lee, "Redundant-Free Web Services Composition Based on a Two-Phase Algorithm," in Proc. the 2008 IEEE International Conference on Web Services, 2008, pp. 361-368.

[8]W. Nam, H. Kil, and D. Lee, "On the computational complexity of behavioral description-based web service composition," Theoretical Computer Science, vol. 412, pp. 6736-6749, 2011.

[9] S. C. Oh, D. Lee, and S. R. T. Kumara, "Web service planner (WSPR): An effective and scalable web service composition algorithm," International Journal of Web Services Research, vol. 4, pp. 1-22, Jan-Mar 2007.

[10] R. Hewett, P. Kijsanayothin, and B. Nguyen, "Scalable Optimized Composition of Web Services with Complexity Analysis," in Proc. the 2009 IEEE International Conference on Web Services, 2009, pp. 389-396..