ENHANCED APPROACH FOR DYNAMIC WEB SERVICE COMPOSITION

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ABSTRACT

Web services are small applications that can be separately deploy and invoked by further software or services on the web. Service is a network addressable software component to perform a specific task. A service discovery mechanism can be used to find services that can be executed and satisfy a service request. A service composition generates a composition plan and a composite service to satisfy a service request. Lots of Web service is available for similar kind of task but at the time of choosing service, Quality of Service (QoS) is considered for better results. In Dynamic Web Service concept multiple services are composed together and generate final results appropriately. Here proposed approach is considering two QoS value that is rating of service and response time. By using those parameters, selection of web service been optimized and overall searching time been improved.

Key words: Web service, php, xml, Dynamic composition, QoS, Service repository, rating of service, response time.

Internet contain many web services for different purposes like E-commerce, information services, trending between partners for business, some B-B services, message gateways etc. Web service contains Application programming Interface (API), which is accessible over network & executes services at host machine. web services provide different kind of roles that are service provider, requester and broker.

Services are small components present on internet that cooperatively make a complete application environment \[1\]. By using Web services, System development task is becoming very easy, where standalone and integrated apps can be published with less effort and with high security because there is no need to expose their implementation details \[1\]. In web, many services are available for specific task, but here challenging task is choosing most appropriate services some time user not satisfied with one service for their task, so composite service is used. SOA enables that kind of seamlessly service binding, discovery and invocation of service at run time. The true capacity of SOA can only be achieved through composing multiple services into more capable and powerful applications \[7\].

From a business perspective, services composition dramatically reduces the cost and risks of building new business applications in the sense that existing business logics are represented as Web services and could be reused \[7\]. In dynamic web service composition appropriate services choose and compose at run time. That kind of business process is build from composition of many services. The main interest of web service compositions is to give value-added services to existing web services and introduce automated web services \[7\].

The fundamental Web services platform is XML + HTTP. All the standard Web Services works using following components.

- SOAP (Simple Object Access Protocol)
- UDDI (Universal Description, Discovery and Integration)
- WSDL (Web Services Description Language)

SOAP is a lightweight protocol for exchange of information in a decentralized, distributed environment. It is an XML based protocol that consists of three parts: an envelope that defines a framework for describing what is in a message and how to process it, a set of encoding rules for expressing instances of application-defined data types, and convention for representing remote procedure calls and responses \[1\].

WSDL (Web Services Description Language) is an XML-based interface description language that is used for describing the functionality offered by a web service. \[10\] A WSDL description of a web service (also referred to as a WSDL file) provides a machine-readable description of how the service can be called, what parameters it expects, and what data structures it returns.

As atomic web services are limited in functionality, Web is not able to fulfill user request some time. So for better business application one or more services are combined together & provide appropriate response to the end user. At the time of service composition changing task is find appropriate service from many others and another task is composition of that service at abstract level. Mainly two kind of service composition are in picture. 1) Static composition 2) Dynamic composition

Static Composition: In this, business process, partners & services are known at time of designing of system and that are not change frequently. Designer manually build composition scheme & according to that flow services are composed one by one. This kind of composition is used for providing interaction to known components. This takes more time as well as Efforts \[1\].

Dynamic Composition: In this, business process, partners & services are changing at run time, in that also changing business partner policies. Business process should flexible enough and provide selection of service run time according to users requirement & context \[1\]. In that kind of composition service composition scheme generated automatically & that not need user interaction. Therefore multiple service combined together according to users need & provide create high level business application. Best example is tourism planner In that many services used like flight services, bus services, hotel services etc, and that all are depends on each other.
There are few problems in dynamic web service composition as discussed in [7].

- The number of web services is increasing with time and it is difficult to search the whole repository for desired service in order to use it for the fulfilment of specific goal.
- Web services are dynamically created and updated so the decision should be taken at execution time and based on recent information.
- Different web service providers use different conceptual models and there is a need of one structure so that web services easily access each other without any technical effort.
- Only authorized persons can access few of these web services.

2. RELATED WORK

Research on Web service and service oriented architecture is going on from many last years. Mainly that research consider how to discover appropriate service in SOA environment, how to compose different kind of service, static service composition techniques, solving dynamic service composition challenges, how to achieve automated composition in low cost, how to maintain service quality menace all time getting proper response in low time, how to achieve flexible and error handling framework.

Maria Allauddin, Farooque Azam [2] proposed solution for dynamic web service composition with parameter matchmaking. In that architecture they proposed dynamic scheme for composition by using small user interaction with system for maintaining correctness. In that they compare no’s of entered parameters with i/p-o/p parameters. If the number is same, composition is performed without any interruption. If numbers of parameters do not match the user is prompted to select or enter the required parameters. By using this framework author solved main problem facing during dynamic WSC that is transactional support and correctness with use of user interaction but when we consider Quality of service & other non-functional parameter than this framework is not very useful. This framework is only used when consider limited WS for small application.

Manish Godse, UmeshBellur, Rajendra Sonar [8], proposed Selection of web service using QoS constrains. In that QoS Manager had a role of being a moderator amongst the provider and the client. Kyriakos Kritikos and Dimitris Plexousakis [9], proposed QoS constrain based selection in that they discuss about Qos broker publish system that Extract the quality of service constraints in the issued WSDL and the values extracted are stored in QoS DB and the fundamental features are issued in the UDDI registry and service matching procedure is applied, and finally, service with the highest quality selected and proposed to the service requester.

In our previous paper we studied different approaches for dynamic composition and proposed new architecture on the bases of that study [2][3][4][5]. in our proposed architecture selection of service is based on QoS parameters like response time and rating of service [1].

3. PROPOSED APPROACH

The proposed approach uses web services, whose selection is done on the bases of input parameters. During the selection of web service the proposed approach takes into consideration, data that are stored in the service repository (SR).

SR Contains.

- **Response Time (Ts):** The time interval between when a service is invoked and when the service is finished.
- **Rating of service (RS):** Information about, service successful composite or not?

Rating of service (RS) is a integer value, that is increment all the time when successful execution of service is possible and provide user oriented output.

In proposed approach above defined QoS parameters are associated with all different kind of web services which are used in the system and dynamic workflow is been possible as user requirement. so this approach is been flexible for providing different kind of requirements of end –users.
By considering QoS permeates at the time of service selection, this approach is capable to select best service from multiple and by using that services in composition system, overall execution time is decrease and faster user oriented output is generated. In this approach user interaction is needed at some point so correctness is possible. Here we apply QoS criteria based service searching so less time is required for search the web services. After selection of service, composition plan is generated and final output is given by the system. After getting output rating of selected service is increase automatically. Here we defined some useful terms which are used in proposed approach.

3.1. Flow Chart
This section explains Flow chart and steps of the proposed approach.

![Flowchart of proposed approach](image)

**Figure 1** Flowchart of proposed approach [1]

Steps:
- User request for the service
- Prompt for required input for service
- Translate that input into machine readable form
- Requested service match in service repository with consideration QoS parameter.
- If valid match found then add service in to composition manager. This process is running until select all selected service for composition.
- Not found valid match than User have to choose, want to exit from composition or request for new service query that is new input data for searching.
- After adding all required services in to composition manager, from that results are evaluate
- Translate that results and respond to user.
• After getting results, update SR info of relevant web services.
  Note: Service match found from SR only which contains trusted Web services required for application

3.1.1. Steps For Service Selection
Here we take holiday booking scenario which consists three different kinds of web services

- Flight service
- Hotel service
- Car service

If we assume that we have n different kind of web services for hotel, flight and taxi than big question is which services been selected for composition. In our approach we provide QoS criteria based service selection which consists response time and rating of service.

- At the 1st time we consider response time for service selection. So for that, which services have lower response time is selected.
- After successful composition rating of that services are increased. Now we are considering high rated services for composition.
- But when more than two services having same rating than updated response time related to services are been consider for selection of services.

3.1.2. Steps For Service composition

- For composition set of services are required. so for that we used previously selected services from all three web services
- After successful composition of services we get summary of response in output that consist final summation amount for all services.

4. IMPLEMENTATION
We implement our proposed approach on php/MySql using NuSOAP library. Apache is used as a local host. For implementation part we consider travel planning system in that considers flight and hotel services. All the services are created using php(NuSOAP Lib). For complete understanding of concept we built whole system that consider frontend and backend. Frontend consider user interaction module of the system and backend consider as a admin module.

5. EXPERIMENTAL RESULTS

5.1. Initial Stage
For implementation we take one scenario of holiday booking, in that we create three type of services like flight service, hotel service and car service. in our application we take two different services for all kind. At the first time use we take QoS parameter response time using contract document. At that time rating of all services is 0, because no one services are used single time.
5.2. Front Side
This module takes parameters entered by the end-user and considers those parameters for generating results. At the front side, searching results are produced after filling up all the details and clicking on the search button. At the time of searching, first of all, select the best web service according to its response time and rating of service. Same as in flight service, all the appropriate services are selected at the time of the intermediate process stage. In that, all dependence search are done and results are composed as described flowchart.

![Figure 2 Backend side (Initial)](image)

![Figure 3 Frontend of Flight search and result](image)
From above result we show that how dynamic selection of hotel according to destination place of flight is done. And at last flight service and hotel service is composed dynamically.
In this module QoS parameters are updated. After confirmation from the payment module update process is done. Once we get booking complete page at that time backend side response time is calculated and stored as well as update rating of service to the relevant services which are take part in composition. Here response time calculation is based on some php/mysql inbuilt functions which are shown in coding part.

6. CONCLUSION AND FUTURE SCOPE

Approaches which are studied in literature for service composition is not providing effective result based on consider parameters like response time, QOS, correctness and exception handling. As we know web services are increasing day by day and also increasing its usage for web application. So Quality Of service is primary goal of any system, using this proposed approach QOS is improved in context of response time. By calculating availability of services and rating of services correctness of result and searching of service is become easy and time required for composition is less.

In future with AI-planning & Case base reasoning approach used with proposed approach and developed highly improved service composition scheme with AI compatibility as well as QOS. In proposed approach Matching algorithm does not consider semantic or context while finding the usable services. A semantic and context based matching algorithm can be developed to identify services more effectively.

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REFERENCE


