

# Application Based Selection Techniques for Improvement in Web Services Deployment

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**ABSTRACT:** It has become difficult to access relevant information from the Web with the unpredictable growth of information available on the World Wide Web. One of the promising approaches is web usage mining, which mines web logs for user models and recommendation. In the domain of web services, it is common to find a redundant service that provides functionalities to the clients. Services with the similar functionality can be clustered into a group of redundant services. Respectively, if a service offers different functionalities, it belongs to more than one set. Having various web services that are able to handle the client's request propose the necessity of a mechanism that selects the most fitting web service at a moment of time. This paper presents an approach on Repository Based Web Services Selection for dynamic service selection based virtualization on the server side. It helps managing redundant services in a transparent manner as well as allowing adding services to the system at run-time. In addition, the model assures a level of security since the consumers seldom have direct access to the web services and server.

**Keywords:** Web Service, QoS, Service Selection, UDDI, XML.

## I. INTRODUCTION

Web service is defined as a software at a network address over the web or the cloud, it is a service in the perception of utility computing. It can summarize a specific assignment or can be designed as a composition of different services, representing a complex aggregation. The Web Services abstract model describes the process of discovery, request and response. Discovery is the method for finding the service that provides the functionality which is required. The API which is used for web in the development of web services is simpler representational state transfer (REST). These APIs does not occupy XML-based web service protocols like SOAP and WSDL for the support of any interfaces. These APIs allow grouping of multiple web resources for designing of novel applications.

Service providers describe their Services and advertise them in registry called Universal Description Discovery and Integration. This assist service request for searching of registry to find the services. These services allows for the creation of registries that are available over the web. Many software companies like IBM, Microsoft, and Oracle all have public UDDI servers running for mercantile purposes may also used as third party servers as confidential servers. In this service client offers two approaches to access the server: either through a individual application providing an user-friendly interface for developers or from end to end a software library working with the Web Service to provide end user as shown figure 1. The Browser which is used for this protocol is an open-source UDDI client to send a request to the server. User can use the application to surf, explore, and even change information which is available in the UDDI server [1] and [3].

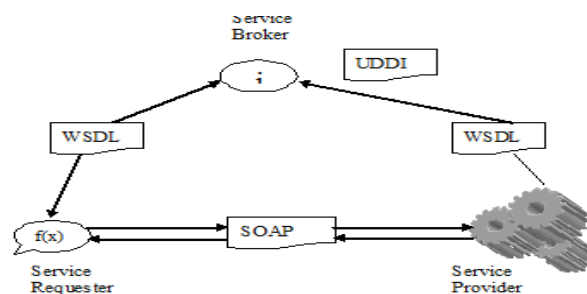


Fig 1: service Entity between user and provider

### A. Description of WSDL (Web Services Description Language)

1) It is an XML-based language for describing Web services and how to access them for difference environments.

- 2) It is an XML based protocol for exchange of information in decentralized and distributed environments which is a standard format for describing a web service.
- 3) It describes how to access a web service and what operations it will perform and how to interface with XML –based services
- 4) WSDL is an integral part of UDDI, an XML-based worldwide business registry.
- 5) It was developed jointly by Microsoft and IBM.
- 6) WSDL is pronounced as 'wiz-dull' and spelled out as 'W-S-D-L'

**B. Description of UDDI(Universal Description, Discovery and Integration).**

- 1) UDDI is an XML-based standard for describing, publishing, and finding Web services for the specification of distributed registry of web services.
- 2) It is platform independent, open framework, can communicate via SOAP, and other technologies.
- 3) It uses WSDL to describe interfaces to web services and can be seen with SOAP and WSDL as one of three base standards of web services.

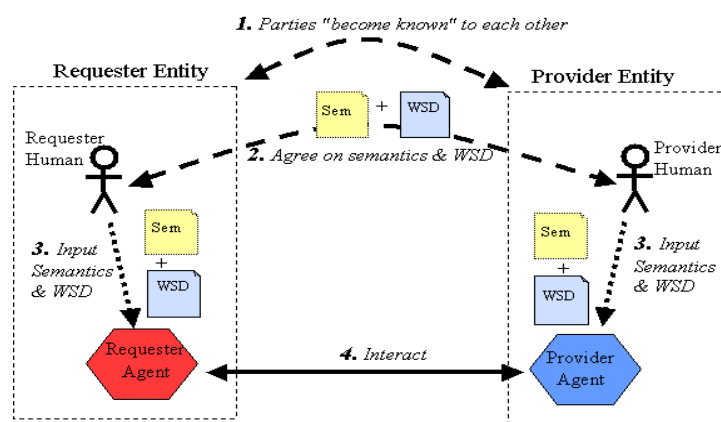


Fig 2. Process of web service

The request entity might engage and use a web service by the following ways:-

- 1) The providers and requesters must know to each other before sending and request or response.
- 2) The provider and requester entities agree on the service description and semantics that will preside over the interaction between the requester and provider agents.
- 3) The service description and semantics are realized by the requester and provider agents.
- 4) Then requester and provider exchange messages, thus performing some task on behalf of the requester and provider entities as shown in the figure 2.
- 5) If the requester entity wishes to begin an interaction with a provider entity and it does not already know what provider agent it wishes to engage, then the requester entity may need to discover a suitable candidate.
- 6) Discovery is the act of locating a machine processable description of a Web service that may have been previously unknown and that meets certain functional criteria as shown in figure 3.
- 7) A discovery service is a service that assists the process of performing discovery. It is a logical role, and could be performed by the requester agent, the provider agent or some other agent.

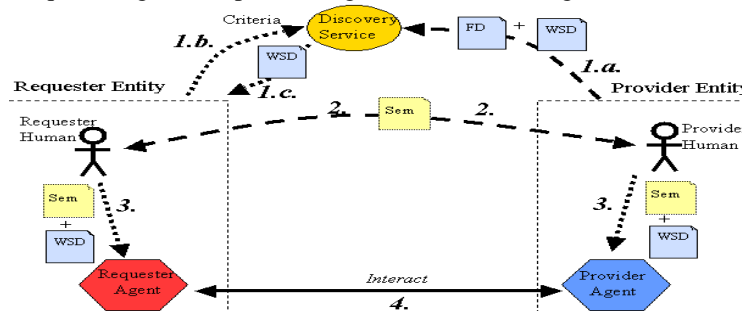


Fig 3. Discovery Process of a web service



Web Services gives Quality of Service (QoS). Which is used to eliminate out unproductive providers, QoS can be used to determine the basic criterion such as easy of use, consistency, malfunction rate, quality, load of the network, and rate of failures can be expected at a point of time. To differentiate from one service with another using the particular criteria, this component requires a set of APIs as instructions by using these instructions. Hence, one can find most appropriate state that would help to evaluate each component and choose most correct one respectively. The group of commands can be seen in XML Web services which enables the user to deal with the data and the remote access of programming logic using XML messaging to migrate data from end to end firewalls and linking heterogeneous systems. Using remote access of data and application logic can be achieved as loosely coupled mode. Hence, by using web services we can achieve new perception. In these Services, the protocols and interface hides the presentation details of the provision, allowing it to be used autonomously using of the hardware and software platform on which it is implemented and also the applications which is used. By this we can achieve web based programming to be loosely coupled module oriented implementations [4]. By using web service we can propose selection technique. The principle of web service is to select best possible web service for a meticulous task. The dynamic discovery in web services is to get the result of discovery which is in common which supports for more than one provider. In file sharing peer to peer system a downloaded file can be split into tasks which can run on multiple systems where a service used between provider and a consumer. Among all candidate providers the web service provider should choose only one to achieve the invocation. The selection issue desires to be addressed yet for a composite web service consisting of numerous atomic services for multiple providers for an atomic service to build dissimilarity between the services.

## II. SERVICE ORIENTED ARCHITECTURE DESCRIPTION

The Service oriented architectures consists of Service Oriented Architecture articles where these derived as Service Oriented Architecture. The SOA is derived from web services. The web services are the connection technology of SOA. It sends the service request from service consumer to service provider and service response from service provider to service consumer.

### A. *Web Service description*

It is a software system acknowledged by a URI , whose unrestricted interfaces and bindings are defined and described using XML These systems may then interact with the web service in a manner prescribed by using XML based messages conveyed by internet protocols. These services are open model ( XML, SOAP, HTTP etc.) based Web applications that relate with other web applications for the purpose of exchanging data or information. These are used to convert existing applications into web applications. Web Services are independent, modular, disseminated, self-motivated applications that can be described, published, located, or invoked over the net to create products, processes, and provide chains. These applications can be local, distributed, or Web-based. Web services are built on top of open standards such as TCP/IP, HTTP, Java, HTML, and XML.

These services are XML-based data exchange systems that use the Internet for direct application-to-application interaction. These systems which can include here are programs, objects, messages, or documents. Web services can be seen as software components with an edge to converse with other software components. They have certain functionality that is available through a special kind of Remote Procedure Call ( RPC).

### B. *XML-RPCin Web service*

This is the XML based protocol for exchanging information between computers.

- 1) It is a protocol that uses XML messages to perform RPCs which are platform independent.
- 2) Requests are encoded in XML and sent via HTTP POST and responses are embedded in the body of HTTP.
- 3) It allows various applications to communicate.

### C. *Web Services Components*

The web services works using following components such as

- 1) SOAP (Simple Object Access Protocol)
- 2) UDDI (Universal Description, Discovery and Integration)
- 3) WSDL (Web Services Description Language)
- 4) This communication architecture contains three subcomponents.

Service Consumer: It is an entity which is utilizes the Web service.

Service Transport: Consumer uses for interacting and communicating with a service.

### D. *Service Provider*



In order to keep the whole system truly platform-independent, transport in both direction uses XML. This includes the description of an operation to execute and the data payload as well. Although transportation is not restricted to a specific protocol or method, HTTP became the most popular way to pass on XML documents between Web services [2] and [6].

#### E. Simple Object Access Protocol (SOAP):

It is an XML-based protocol for exchanging information between computers and web services.

- 1) SOAP is a communication protocol between applications for sending messages which are platform and language independent.
- 2) It is simple and extensible, allows to get around firewalls.

It was designed as a lightweight protocol for exchange of information in a decentralized, distributed environment.

It is a frame work for enabling communication between different web services without prior knowledge of each other. It allows in performing remote procedure calls and therefore removes the requirement such as platform and language independent It also defines base level encodings as data encoding rules. Therefore clients and servers are free to use different conventions for encoding data. All this is done in the context of a standardized message format.

The primary segment of this message has a MIME type of Text/XML and contains the SOAP envelope which is an XML document. The envelope consists of a an non obligatory header which may target the nodes that perform intermediate processing, and a mandatory body which is intended for the final recipient of the message. This way a firewall can be adjusted to sort out SOAP Messages with an inappropriate header. The header may also hold digital signatures for a request contained in the body. The body contains the serialized payload. For a request this is the method argument where the surrounding XML tag must have the same name as the called method. The response body contains the return value if it exists. Data types are not delineated in the SOAP envelope explicitly so the type of a result parameter cannot be discovered just by looking at the SOAP message [4].

#### F. Usage of a Web Services

Several steps are involved to use a web service that has to be followed to execute each step.

##### 1) Location of a Web Service

This can be done by using active WSDL file or by browsing UDDI registry. The UDDI registry can be private and which are easier to maintain because of their size but difficult to find the UDDI registry position. Sometimes we have observed that WSDL documents can be used as a company's main web pages.

##### 2) Creation of a SOAP Messages

It is used as a development tool like Web Service Development Kit or BEA web logic to create valid messages of SOAP for the methods used in UDDI registry or WSDL.

##### 3) Communication

Message transportation via HTTP is the service providers firewall setting which is an advantage communication. If the firewall permits different Port numbers through (HTTP POST/GET) connections, a SOAP can be able to pass a message as well. If the firewall incapable to filter and process a SOAP requests then it leaves the system feeble to attackers for the users who are using web service's functionality are difficult to communicate and there is a chance for possible attack

##### 4) Parsing of a SOAP message

This is done by using different Application Servers. The parser decides which procedure to call for a valid request

##### 5) Processing of a Message

Different service provider calls all essential procedures, or Web services, to complete the required task.

##### 6) Return the Result

The result is enclosed in a SOAP replies and returned to the requestor where the client application can parse the message and assess the included information [6] and [7].

### III. RELATED WORK

Researchers have proposed various approaches for dynamic web service selection. Maximilien and Singh proposed a multi-agent based architecture to select the best service. Maximilien and Singh describe a method in which proxy agents collect data on services, and also interact with other proxy agents to maximize their information. Between the Service consumers and service providers their lies proxy agents. In deed the agents contact a service broker, for collection of from known services, and also ratings about its observed Quality of service. Then the information is

pooled with its own sequential usage, which is used to select a service, the authors do not detail how agents contain information about the communications between the clients and the services during the Web Services selection process. The expectation and reputation are taken into account during the decision process. Their approach can be used for dividing the QoS attributes into objective and subjective. The former include QoS features such as accessibility, consistency, and response time [3] [8].

Recently they proposed features which is well for selection criteria on QoS based selection service by using excellence criteria such as execution time, duration and reputation. In addition to this ,duration execution price, transactions support, compensation and consequence rate and etc are the other criteria. The authors are recommend for a dynamic framework to evaluate the QoS for the existing web services based on client's advice by monitoring their requests. The ultimate goal is to get the interpretation mechanism that is responsible for the selection of a Web Service at a moment of time. This unit uses a set of instructions to differentiate one service from another by using particular criteria to evaluate each component and to select appropriate one respectively. The components are used for reasoning mechanism selection technique, model and criteria. The model collects data from the participants for client-server interaction to get aggregated measures. In this approach , the method proposed by Liu, Ngu, and Zeng computes the QoS of the Web Services, ranks them to selects the appropriate one. To show the QoS registry in their system, it takes the data from different clients and stores it in a matrix of web service, in which each column represents a QoS parameter. Each row represents a web service to execute a number of computations on the data, such as normalization etc. Then based on the client requests, clients can be given to access the registry. The restricted access of the approach is the dependency on the consumers to give regular feedback about their earlier experience with the Web Services. The success of this model is based on the client's usage to provide the necessary feedback on QoS [9] [10].

#### IV. TECHNIQUES FOR PROPOSED SYSTEM

In the field of Web Services, it is difficult to provide redundant services to the clients. According to the this web Services conceptual model, the client receives a list of services from the Universal Description Discovery and Integration and it selects one, for an interaction with the service to process the request. In earlier, service selection is a significant process and different techniques have been proposed. In this study for dynamic service selection, the invocation is done which has the following advantages in comparison with earlier services.

- 1) It gives the particular location and duplication of the Web Services.
- 2) From the client, it hides the system's complexity, assurance of security because client does not have direct access to the web services.

In the proposed model the real world application and evaluation of a system is complex, it requires lot of resources like machines that run a set of experiments on time for each experiment it has to dedicated setup, run, and analyzed. The results of the experiments depend on the particular machine specifications and environment settings, such as web server, communication style. There is chance of Fluctuations, due to loss of connection in a network, lack of memory, CPU, caching, and garbage collection . All these may reflect on the correct analysis of the data obtained and the conclusions. In addition, such an implementation is based on certain standards, protocols, and programming languages.

##### A) Proposed Repository Based on Web Services Selection

We proposed a method for handling the redundant web services and selection of dynamic Web Services Here we are introducing a model with a Web Service repository, as shown in figure 4 will act as an self-determining unit for possessing a specific functionality in turn this repository will be used to forward the client's request is also provides security. since it will not be allowed to invoke directly allow access by the clients. This method will avert unauthorized access to the real services and also helps to hide the systems complexity from the clients. Here the repository will achieve three functions that is, reasoning , collecting and storing. A report is generated by the client in QoS feedback which provides reference for the consumer to access the provider. Each provider keeps track of feedback information.. The collecting procedure retrieves all critical information from the providers for reasoning operation. The reasoning operation manages to select the best service provider for the consumer according to the collected data. Consider an example where clients needs the services (S1,S2) as in figure 4 and 5, it sends a request .The collecting, storing and reasoning mechanism interacts with the web services to find the most appropriate of the services and the results are stored in the repository for future reference is done under reasoning.

In turn Web Services interacts with the reasoning mechanism to find out the suitable services. once the service is selected, the request is forwarded to it. At the end, the generated result is passed to the repository which sends it back to the client.

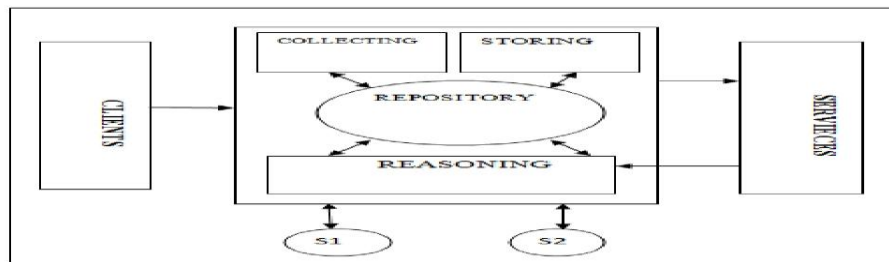


Fig. 4 Repository based Web Service Selection

### B) Selection of Service-Algorithm

This algorithm shows the necessary steps to choose a service and get the maximum quality results.

- 1) For finding a service for a specified task, perform a search on list for service descriptions .
- 2) Arrange all discovered services by their signature parameter and discard all other services.
- 3) acquire the desired Service Parameters.
- 4) Gather the services result and order by their utility.
- 5) If no results are found, let the client re-evaluate the constraints, go to step 2.

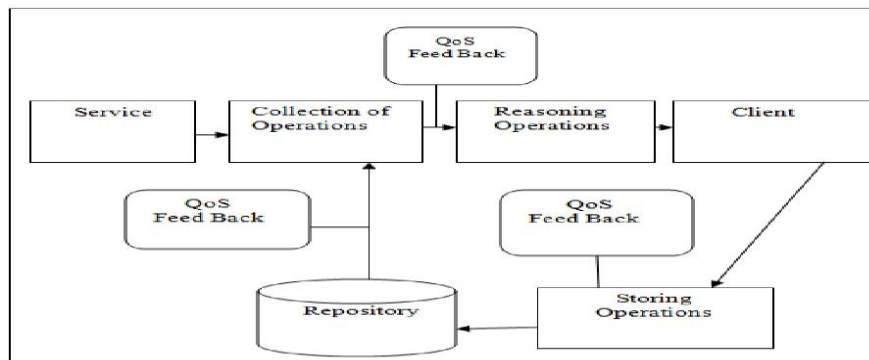


Fig. 5 Selection Process

This algorithm provides an approach for selecting a specified service. Services, not matching the profile are discarded.

### C) Idea for the anticipated Architecture

Now we present an overview of the repository based web services selection, and the design of simulation model that is used to evaluate the Repository Based Web Services Selection approach. Here the architecture consists of three main components such as Repository Layer Web Services and Clients for forming the key compound objects of the high-level view of the simulation design. In this approach the Object load generator which generates clients' requests(entities); object represents the activities of the model, of which each object corresponds to a Web Service. The Repository Based web service selection entities are accepted by the Object load sink as the end point of the entity. In this approach the Component Manager is not incorporated, since the simulation runs before the reasoning mechanism are defined. There is a essential Web Service corresponding to each group of redundant services with particular functionality. The reasoning mechanism is presented by a server and a queue.

### D) Evaluation

- 1) Now we are evaluating the proposed Repository Based Web Service Selection approach.
- 2) Evaluate behaviour of web services and analyse in different environments.
- 3) Due to the reasoning mechanism the response time of the proposed architecture may increase. This is an expected result since the conclusion is taken at run-time. Furthermore, it checks for a trade-off between the appropriate service selection and the execution time of the system.
- 4) Use simulation method to observe the Web Based Service Selection architecture is a feasible technique for managing redundant services.

The reasoning mechanism does not require any information about the service as it is based on a random selection technique. There is no need for selection criteria for a particular task Since the decision is done in a random manner, neither the data about the services have to be collected and aggregated by the model. The model of the reasoning mechanism contains only the WSDL descriptions of the redundant Web Services.



## V. RESULTS ANALYSIS

In our experiment the results of the developed framework are as follows:

- i) The layer is able to manage the redundant services in a clear manner for this the model has a feasible technique for dynamic service selection on the server side.
- ii) The information which is available to the client are service description of the Web Services. The web services are called by the virtual layer and are never invoked directly by the clients which assures a level of security to prevent unauthorized users from having access to the real services.
- iii) From the consumers point of view the model is the real web service that handle the request for the model it hides for the analysis during the decision making process. The scalability of the system that implements the described layer is expected to be the same as the scalability of a system that does not consist of redundant components. The decentralization of the Web Services assures that there is no single point of control and respectively of failure. There is a separate component that represents and manages each group of services and does not influence the proper work of the whole system.

The obtained data shows that the execution times of the simulation runs are higher for the load balancing technique compared to the fastest service selection but lower compared to the random selection technique. In terms of Web Services overloading, both the fastest and the load balancing techniques present similar results.

## V.CONCLUSION

In this paper we proposed an approach for dynamic service selection and, which has the following advantages in comparison with previous approaches:

- i) It hides the system's complexity from the clients.
- ii) It provides a transparent service selection from the client's point of view.
- iii) It assures a level of security, since the clients do not have direct access to the Web Services.

In future, other technology that can be applied in the Repository based system is Semantic Web technology. By describing the data in a machine-understandable manner and creating semantics of QoS criteria, the decision-making process would be based on more features as well as their relationships would be represented in a better and more flexible way.

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