

## A Study on Different Web Service Discovery Approaches

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**Abstract**— A web service is a software system designed to support interoperable machine-to-machine interaction over a network. In today's date, web services are becoming widespread to utilize the web as a business opportunity for offering their own services and using existing services from others. A web service is a service offered by an electronic device to another electronic device, communicating with each other via the World Wide Web. A web service registry UDDI (Universal Description, Discovery, and Integration) provides interoperable, standards based approach for methodically documenting and publishing web services. Since various services are available, it becomes difficult to find the most appropriate service for an exact application. Faced with the increasing numbers of Web services and service users, researchers in the services computing field have attempted to address a challenging issue, i.e. how to quickly find the suitable ones according to user queries. Many previous studies have been reported towards this direction. This paper presents a study on different web service discovery approaches.

**Keywords**— Web Mining, Web Service Discovery

### I. INTRODUCTION

Web services are defined as self contained and self describing applications that can be published, located and invoked through the web. These are XML based components that can be executed by any application on the World Wide Web irrespective of platform [1]. Web services are developed and published by different vendors using UDDI. It is the mechanism to register and discover web services. The details of a web service are provided in the WSDL (Web Service Definition Language) document. Web services are accessed from the internet through SOAP (Simple Object Access Protocol) that allows programs that run on different operating system to communicate using HTTP and XML [2]. Traditionally, web services are searched using user supplied keywords, which is not an efficient way since a huge number of web services may match a keyword.

In this paper, first we have presented how exactly the web service discovery process is performed. Then we have mentioned advantages & disadvantages of different web service discovery approaches by various authors.

#### Web Service Discovery Process:

Service discovery process locates a web service provider and web service descriptions are retrieved. The process queries the service registry with the needs of the service requestor.

The query contains parameters such as desired service, price, number of results, etc. Once the discovery of web service is over, the client machine should know the location, capabilities and interfacing method of a web service.

The service discovery is of two types, static and dynamic. In static, the web service details are bound at design time and query results are examined by human designers. In dynamic method, web service details are unbound and can be determined during run time. The query results are examined by applications that infer most likely web services.

Generally web service discovery is the three step process with advertising web services by developers is done in the first step. Advertising is done in public repositories by registering their web services using web service description file written in WSDL. Sending of request by the user is done in second step. The request contains details in a format that has been predefined by a web service repository.

Web service matcher matches user requests with available web services and a candidate set of web services are retrieved. Selection and invocation of web service is done in the final step. Selection of the best web service is dependent on the maturity of web service matching algorithm and actual

user requirements. The more formalized way of user requirement representation yields more accurate results as shown in Figure 1.

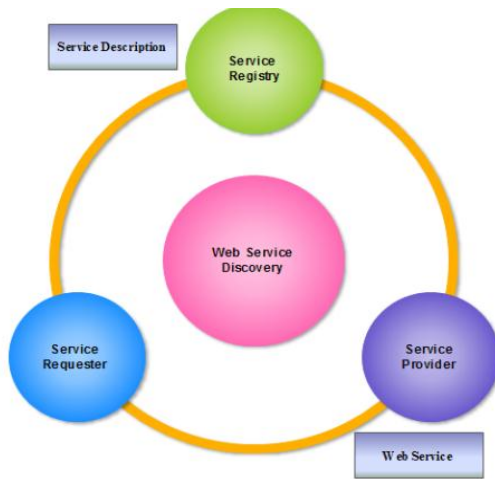


Figure 1

## II. RELATED WORK

Ma. et al [3] has proposed a new web service access and discovery strategy which combines search engine techniques with semantic web concepts. The services are retrieved from the UDDI through the key word search. They have proposed a syntax level keyword matching and additionally they add semantic information to the services, the results obtained from the service result list is weighed by keyword matching and service semantic vector for efficient retrieval of the services.

Ourania H, Georgios B, Mara N, Dimosthenis [4] presented system features an adaptive web service description collection process, through specialized and directed crawling, as well as an enhanced indexing and retrieval mechanism, which handles description documents as semi-structured text, separating actual information from tags and annotations. The paper also presents experiments and use cases regarding different search scenarios, in addition to performance results.

Raj R J R, Sasipraba T [5] proposed QoS aware web service discovery based on input and output operation has been introduced. In this approach, QoS Consultant acts as a broker between client and service provider. The QoS attributes are normalized, and the match score value is stored in the Service pool. The WSDL Parser extracts the input/output operation from the WSDL file and stores it in the service pool. Whenever a search is performed for a given input/output operation, the consultant selects a list of candidate services that are matched with the given request

will be provided to the client for setting weights over QoS attributes. The highest degree of the matched web service will be provided to the client for invocation process. The system has been tested with real and synthetic data which shows propitious result.

Jaber K Walid C Khaled G [6] proposed that to bind to relevant Web services, users need to browse separately a huge number of business registries which consumes time and effort. To cope with this challenge and in response to limits of existing solutions, we propose a local repository-based approach that optimizes the binding of Web services of interest. Furthermore, we present experimental results situating the proposed approach to other ones dealing with the same issue.

J. Zhou et al [7] proposed key word clustering and concept expansion based on web services discovery. In order to find the appropriate services (or) matching of services the authors calculated similarity matrix of words in domain ontology based on pareto principle with semantic reasoning. To find the exact match between service requests and available services bipartite graphs are used.

Dmytro S. Pukhkaiev, Oleksii Oleksenko, Tetiana M. Kot, Larysa S. Globa Alexander Schill [8] stated that Web Service Composition consists of two major blocks: Web Service Discovery, finding web services satisfying functional parameters and Web Service Selection, choosing the best possible combination of web services regarding functional parameters.

Debajyoti Mukhopadhyay, Archana Chougule [9] have given overview of different web service discovery approaches with their advantages and disadvantages. Many approaches differ in the way web service matching is carried out. Some approaches are considering concept of semantic web, while some other focus on information retrieval methods. Some approaches suggest enhancement in web service request based on metadata about web services generated by feedback of other users.

T. Rajendran and Dr. P. Balasubramanie [10] have presented an analysis and study of Web services discovery with QoS Management systems. The purpose of web services discovery is to select optimal web service for a particular task. QoS plays an important role in Web service discovery in order to evaluate and rank candidate Web services that are able to provide expected functionality.

Jian Wang, Member, IEEE, Panpan Gao, Yutao Ma, Member, IEEE, Keqing He, Senior Member, IEEE and Patrick C.K. Hung, Member, IEEE [11] presents a few algorithms to mine common topic groups from the generated service-topic extracting common topic groups is to minimize the number of candidate Web services during the process of Web service discovery. In this paper it is stated that the future work is to leverage more domain knowledge during the process of CTG mining using a must-link, which denotes that two words should belong to the same topic, and a cannot-link, which denotes that two words should not belong to the same topic, will be utilized. Second, further decreasing the computing time of CTG mining is another research direction. Third, we will try to model user preferences according to historical usage services and extracted common topic groups.

### Advantages & Disadvantages of web service discovery approaches:

Table 1

Approach	Proposed by	Advantages	Disadvantages
UDDI: An Extended Registry for Web Services	Shaikh Ali et al	Support for "leasing", Support for searching further attributes of a service,	permit services to register with UDDI for a limited time period
Service Registration and Discovery in a Domain-Oriented UDDI Registry	Liu et al	property table and stores the service property information & service relationship in the database	Need to categorized in to Complementary relationship, functional relationship, reference relationship and service constraint
Similarity-based web service matchmaking	Tretola G and Zimeo E	Improve key word based search and syntactic match	Semantic of services needs to be inferred from their structure
Super peer web service discovery architecture (SPWSDA)	Ayorak E, Bener	Minimize the number of messages routed through the network and to avoid flooding	The networks should be defined semantically with OWL-S
Web Service Discovery based on Keyword clustering and ontology	J. Zhou et al	Since index are used, it is fast and easy to retrieve objects	Indexing process is expensive and it needs additional space
A Specialized Search Engine for Web Service Discovery	Ourania H, Georgios B, Mara N, Dimosthenis A	Retrieval of web services using structural information of OWL ontologies	Semantic Case Based Reasoning (SCBR) measure makes this method computationally expensive
Quality Based Web Service Discovery with an Agent- Based Approach	Rajendran T. Balasubramanie P.	Separate agent is used to rank the web services which makes method fast	Business specific and performance specific QoS for each web service need to be supplied

### III. CONCLUSION AND FUTURE SCOPE

This paper presents a survey on different web service discovery approaches. Also it represents advantages and disadvantages of some existing web service discovery methods. Study shows that existing system do not consider must-link approach which denotes that two words should belong to the same topic, and a cannot-link approach which denotes that two words should not belong to the same topic. Also existing system does not make use of user preferences according to historical usage services and extracted similar word mining. So after making use of must link & must not

link approach as well as user preferences according to historical usage, system performance may be improved.

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