A Literature Survey on Web Service Discovery

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Abstract: **Nowadays Web Services are turning out to be more prevalent and permitting organizations to utilize the web as a business opportunity for offering their own services and using existing services from others. A Web service is a self-describing software component which is universally accessed by means of standard protocols. A web service registry UDDI provides interoperable, standards based approach for methodically documenting and publishing web services. Since more and more services are available and due to rapid increase of published web services in the registry it becomes difficult to find the most appropriate service for an exact application .Hence the discovery of right services is the noticeable issue in this situation. Existing Web service discovery approach is a keyword based search and moreover key word search do not provide accurate services needed by the user. UDDI and various other approaches for discovering web services are prevailing. In this paper we mainly confer about evaluating the discoverability of service through web service methodologies.**

Keywords: WSDL, UDDI, Ontology, Semantic web service Discovery, QOS

1. INTRODUCTION

Web services describes the standardised way of integrating web based applications using Extensible Mark-up language (XML), Simple Object Access Protocol (SOAP), Web Service Description Language (WSDL) and Universal Description Discovery and Integration (UDDI), Where XML performs data tagging, SOAP performs data transferring, WSDL describes the available services and UDDI [1] used as a catalogue for what services are available. Web services are application components coded on XML [2]. Web services can be used by any application unconditionally of platform in which it is developed. Web service description is composed in WSDL document. It can be accessed from web using SOAP protocol. The ability of Web Services to discover, binds to, and invokes other services automatically at runtime—Called as Just in Time (JIT) integration is considered as an advantage of web services. Once a Web service is published, it can be easily discovered and used by other applications.

In this paper we mainly confer about the discoverability of services through web services.UDDI provides a mechanism to find web Services [3] .UDDI specifies a registry of web services which contains Service general description and retrieves a list of services. The service providers can publish information and services .The service requesters can search through the registry to find the appropriate services, personnel information of service provider and the technical information about its services.

The UDDI registry keeps up an incorporated database of web service, classified by service type, information of the provider, and technical information to bind the services and so on. It also defines a standard API for requestors to query the database

II. DISCOVERY OF A WEB SERVICE

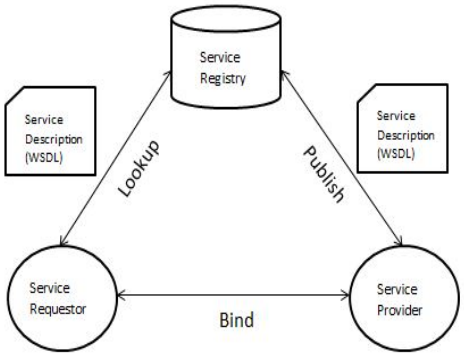

Fig. 1 Discovery of web service

The web service provider in Fig.1is called as the owner of the service. Service Providers advertise web services in public (or) private repositories by registering their web services using web service descriptions written in WSDL [4] .A service requestor sends a request to the registry to find a service specifying the requirement in predefined format to web service repository. Web service match maker matches the client demand with accessible web service and discovers a set of web services. Final step is selection and invocation of one of the retrieved web services. OASIS categorizes information present in UDDI into 1.white pages 2.Yellow pages 3.green pages. White pages consists of the General information about the company that offers the services like name, description, address, etc.Yellow page consists of Common classification data based on standard taxonomies for either the company or the service provided on industrial categories. Green page consists of Comprehensive technical information about web service that permits one to write down an application to use the web service

III. LITERATURE SURVEY

UDDI have focused mostly on simple keyword based search methods for service retrieval , however these methods cannot fully articulate client service queries .UDDI performs key word matching search which is not efficient as there are huge number of web services and difficult to find the best one . In this paper we have proposed various service discovery approaches which differ from others.

1. *UDDIe: An Extended Registry for Web Services*

UDDI has some limitations – the information is categorized in to white, yellow or green pages and based on these categories the search can be done .UDDI does not provide a mechanism for updating the registry automatically as services (and service providers). Shaikh Ali et al proposed UDDIe – an extension to UDDI [5], which suggests the idea of blue pages, contains user defined properties attached with a service and to enable to discover services based on this .They have extended the UDDIe for the following reasons 1. Support for "leasing" – to permit services to register with UDDI for a limited time period 2. Provides Support for searching further attributes of a service - attained by extending the business Service class in UDDI with property Bag, and extending the find method to enable queries to UDDI.

2. *Verification of Web services using an enhanced UDDI server*

Searching Web service using digital signatures is allowed in UDDI version 3. But, it still needs orderly verification to guarantee Web service quality; Tsai et al [6] proposed adding verification mechanism to the UDDI servers incorporating check-in and checkout of Web services. The key thought is that test scripts should be attached to Web service, and both Web service providers and clients make use of these test scripts, before accepting a new Web service into the service directory. The new Web service need to be tested by the associated test scripts, and accepted if the test was successful. Before using a specific Web Service, a client can use the suitable test scripts to test the WS and it is used only if the test was done successfully. This approach is a time consuming process since both the service provider and the requester need to use the test scripts.

3. *Service Registration and Discovery in a Domain-Oriented UDDI Registry*

Liu et al [7] proposed a domain-oriented UDDI Registry architecture and addressed concepts such as service property schema for each service type, which creates a property table and stores the service property information and service relationship in the database. It is further more categorized in to Complementary relationship, functional relationship, reference relationship and service constraint which are generated by extracting the binding information and service interface definition files.

4. *Similarity-based web service matchmaking*

Wu et al [8] proposed Semantic Web service that uses DAML-S as a replacement of WSDL to represent Capabilities of the Web services. They have proposed the changes that allow the software agents or search engines to automatically find suitable Web services via Ontologies and reasoning algorithms with advanced strategies. For each category, a similarity evaluation method has been given. In Web service match making process, these similarity assessment evaluations can be utilized together or independently. They have provided a set of similarity methods which can be used in combination with the current UDDI API and to support a more automated service-discovery process, by recognizing among the potentially useful and the possible irrelevant services by ordering the candidates according to their importance .The authors have developed a Web service abstract model, and divided properties of Web service into four classifications. For every classification, a correspondence assessment method is given. The Lexical similarity shows the comparability of textual properties such as service name and service key. Attribute similarity estimates the comparability of properties which has more supporting domain knowledge and Interfacial similarity evaluates name and data type of the input/output parameters of Web service operations.

5. *Structure matching for enhancing UDDI queries results*

Tretola G and Zimeo E [9] proposed a new approach to improve key word based search and syntactic match called as structure match. In this approach the semantic of services is inferred from their structure and it mainly

concentrates on its operation and parameter types. This approach finds the similarity between the service requested and the set of available service. The authors have implemented a new algorithm which comes under match making framework which uses one or more match making techniques with cascading pipes and filter architecture in order to improvise matching results.

6. *Super peer web service discovery architecture (SPWSDA)*

The entire web services are published and maintained in a centralized registry such as UDDI.Bener et al [10] proposed a super peer network protocol to combine centralized and Peer-peer networks. The main intension of this paper is to minimize the number of messages routed through the network and to avoid flooding in the networks, the authors have proposed CAN structure(Content Addressable network) which has distributed hash table for P2P communication. The proposed architecture consists of self-clustering networks in which the peer groups classify the definitions of web services and also each peers becomes the owners of the classification dynamically. The architecture proposes hybrid peer to peer solution which mainly consists of three types. They are registry peer - repository used to hold information, Index peer- Indexes the registry peers information and client peer – GUI application used to insert the web services to the SPWSDA network.

In order to advertise the web services in SPWSDA the networks should be defined semantically with OWL-S. Here the OWL is used to classify the web services, based on this a vocabulary Owl is created to generate classification tree.

7. *A novel interoperable model of distributed UDDI*

Wu et al [11] proposed a model which divides the whole UDDI servers in to three types namely root, super domain, and normal servers .The Root server records the information of super domain servers, the function of super domain servers is to manage the nearby servers and responsible for registration and inquiry services and lastly the UDDI servers let the users to publish and search the information of web services

8. *A Semantic based Registry for Proactive Web Service Discovery using Publish Subscribe Model*

Nawz Et al [12] proposed a push model for discovering web services. In this model a service notification is given to the service requestors preceding to web service discovery. The authors have used semantic based web service matching in which the service descriptions are matched with OWL-S (Ontology language for web service description) .They have categorized the system in to two phases as Subscription phase in which a subscriber register themselves in to the registry for notification and the notification phase which works when a new service is published on the registry. In the subscription phase the user information along with his location with his specific web service requirement are stored in the subscription knowledge base .The information given by the user can be used later for service matching. Matching can be in one of six levels as 1.Exact 2. Plu g-In 3. Subsume 4. Enclosure 5.Unknown and then 6.Fail.

9. *A federated UDDI system for concurrent access to service data*

A federated UDDI system have been presented for service oriented environment and works within the company (or) enterprise. The system is designed for concurrent access to service data. Liang et al [13] has proposed an efficient concurrent access control technique .The technique comprises optimistic time stamp ordering based synchronization. This approach allows the non-conflicting queries to run con currently and for conflicting requests the queries are buffered.

10. *Discovery Engine for Efficient and Intelligent discovery of Web Service with publication facility*

A discovery and publishing engine has been proposed with capabilities of using service reviews for publishing and discovery. The proposed engine has the capability to search web services across various Universal Business Registries (UBRs). Tewari et al [14] have used classification scheme and performed a validation test on web services. The system is employed with clustering data techniques .Using this technique the system suggests the second best appropriate service to the client and more over the authors have used reviews and ratings to the existing service registry to improvise the web service request with service information.

11. *Web Service Discovery Based On Semantic Search Engine*

The services are retrieved from the UDDI through the key word search. Ma. et al [15] has proposed a new web service access and discovery strategy which combines search engine techniques with semantic web concepts. 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.

12. *Quality Based Web Service Discovery with an Agent- Based Approach*

Rajendran and Balasubramanie [16] presented an effective approach for finding most appropriate web services according to the user requirements .The authors have proposed a scheme based web service architecture based on consumers requirements of the various non-functional properties with functional requirements interacted with the system. And they have proposed an approach for designing and developing an agent based architecture

with Quality Matching, along with they have used Feedback Rating with Service Discovery algorithm for evaluating the web services. The authors have proposed an architecture which has an extended UDDI to house the Qos parameters. The Web Services Agent mainly has five components: 1.Service Publisher 2. Verifier and Certifier 3. Retrieval Agent 4. Quality Analyzer 5. Web Service Storage (WSS). The Agent performs the interaction with the UDDI. In addition to that the web services agent assists clients in choosing web services based on Qos parameters. The Quality of service information is represented in UDDI registry by a tModel.The following Qos parameters are considered price, availability, response time and throughput.

13. *Web Services Discovery across Heterogeneous Military Networks*

Conventional methods for web service discoveries like UDDI and eb xml are not suitable for military networks because these methods are centralized. F.johnson et al [17] suggested a web service discovery solution for military networks. The authors have suggested service discovery gateways so that each network domain can utilize the most appropriate protocol .The proposed mechanism is called as SAM- Service advertisements in MANETS which gives a decentralization approach for web services discovery. In order to make the resource efficient it integrates the following methods like periodic service agreements, caching, local service information, compression and piggy backing .A gateway which checks (or) queries all services from the web services proprietary domains periodically and if the services are available then must be viewed up in the gate ways of the local service cache .If the service is not available in the cache then it has to be translated from one service description to another and published in to the network and added in the cache

14. *A Specialized Search Engine for Web Service Discovery*

Hatzi et al [18] proposed Wess-A web service search engine to discover and to retrieve web service descriptions. Wess discovers both semantic such as –Web ontology language for services and non-semantic such as WSDL. The proposed system collects description of web services through crawling and the services are indexed and retrieved through advanced key words. The web service descriptions are identified by three methods First one is checking the extensions of the document i.e. wsdl, owl etc.., checking the content type field of the HTTP for web service descriptions and the last one is checking the header of the source code for identifying web service descriptions.

15. *Web Service Recommendation Framework Using Qos Based Discovery and Ranking Process*

Selecting the appropriate service according to the client requirement is a complex task, since there are more number of similar web services are available to satisfy a particular task. Web services search is made through key word search, if the search query does not match the part of the exact web services then the services may not be retrieved. A mechanism is needed to find the appropriate web service which matches to the user requirement Raj et al [19] proposed a Qos based discovery mechanism to search web services based on clients Qos requirement along with the input and output operation .The basic idea of this approach the service requestor can specify the search request for input and for the expected output operation additionally the client can specify the required Qos attributes. Based on the request given by the service provider, a list of services matched with the request will be provided to the clients for setting weights over the Qos attributes.

The proposed architecture describes the Qos defined web service discovery. Once the web services are published the web service descriptions are searched by the crawler and stored in the database. The Qos handler stores all the Qos attribute values using normalization algorithm and store it in the service pool. A wsdl parser is used to extract the Meta data from the Wsdl file and the data gets stored in the service pool. The cluster agent cluster the terms and store them in the service pool, to get the concepts. Additionally the feed manager indexes the web services so whenever the clients is requesting some service via user interface the consultant searches the appropriate web services to the clients Qos requirements.

16. *UDDI Using Ontology for Automated Service Composition*

X.Ren et al [20] proposed P2P infrastructure which does resource sharing and services by the direct interaction between equal nodes. A new discovery mechanism is projected to replace the traditional UDDI concept and by distributing the functions of the UDDI to all the P2P network peers. According to the service ontology each and every service would be registered on a specific peer in a CAN based P2P network. The proposed framework consists of web service translator and the web service distributor where the web service translator lies in the first layer, translates Wsdl files in to OWL-S files. OWL-S descriptions are organized into three areas namely

(i) Service profiles describing the basic descriptions of the web services for publishing and discovering,

(ii) the process model explains the work of web services, describing the number of inputs, outputs, preconditions and effect where inputs represents the information for executing the process and the outputs are the process information that returns after execution and the precondition explains the conditions that should satisfy for the web services to execute correctly and the execution consequence and the results described by the effects.

(iii)The service groundings specifies the details for how to execute the web services

The web services distributor lies in the second layer of the system which distributes and publishes the web services on the ontology based P2P infrastructure. After extracting the information from the web service translator its figures out the location of the published web services in the P2P network

17. *Binding Web Services: an Optimizing Approach*

Binding to relevant web services the user needs to search numerous number of business registries which takes more time and Kouki Et al[21] proposed Local repository based approach that optimizes binding of web services from heterogeneous environment and to present a local access point for users to articulate their search queries in an efficient manner. The proposed architecture consists the following components PWSR –Public web services repository which is used to collect the service bindings from the public business registries ,PWSCE –Pubic web services crawler engine which is used to collect service bindings from the public business registries in to the Public web services repository,LWSR – Local web services repository which is used to collect the frequently used web services bindings,LWSCE- stands for Local web services crawler engine used to collect the service bindings from the frequently used web services from the public web services repository in to the local web services repository,PWSSE –Public web service synchronization engine which is used to collect the updates of web service bindings from public business registries in to the public web services repository ,LWSSE – Local web services synchronization engine which is used to forward updates service bindings from the public web service repository to the local web service repository for the frequently used services and PBR's –Public business registries provides a collection web services bindings over the internet. The performance is improvised when frequently used web services bindings are saved locally in Local web services repository.

18. *An e-commerce UDDI model in P2P network environment*

The traditional E-commerce application architecture, a centralized UDDI model has poor network scalability and reliability.J.Jin et al [22] proposed a decentralized P2P network to the UDDI model which helps to solve the integration problem between the traditional UDDI service registries and P2P networks. The main aim is to achieve service publication and service discovery function through the association between the UDDI service registries. The user will be requesting the service to the UDDI, when the requested information is not available in the source service registry then the request is forwarded to other service registries through P2P communication model. The processing request is completed through the collaboration among the service registries.

19. *Web Service Discovery based on Keyword clustering and ontology*

J. Zhou et al [23] 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.

20**.** *Using Inverted Indexing to Semantic Web Service Discovery Search Model*

In order to improvise the web services retrieval efficiently, Zhou et al [24] suggested some indexing mechanisms such as inverted indexing and the latent indexing for the available web services. In the proposed method the user request is matched with OWL-S descriptions of web services .The list of keywords and the frequency of the key word of all OWL-S documents is maintained. In these circumstances the inverted index is used to check whether the OWL-S description with the given id contains the term .For efficient searching every keyword is connected to the list of document ids.

21. *A Novel Semantic Web Service Discovery Scheme Using Bipartite Graph*

Efficient mechanism for web service discovery is becoming one of the main concerns due to the enormous upsurge web services. The current semantic matchmaking algorithms shall be improved on minimized service discovery time and increased quality. Shirin Akther et al [25] proposed a new semantic Web Service discovery scheme by means of bipartite graph and improved Hungarian algorithm to achieve this. This method involved two steps:

(i) Constructing a bipartite graph, in which either the input matching or output matching was considered as the problem of optimal matching with bipartite graph

(ii) Semantic matchmaking according to four degrees of match namely exact, plug-in, subsume, fail.

They have optimised the current Hungarian algorithm to obtain a completely matched bipartite graph.

22. *Web Service Discovery based on Semantic Description*

Retrieving the most relevant web services according to the user's need among the vast range of available web services is an essential task. Generally, the discovery process is keyword based, syntactic based or semantic based. However some web services might exist without proper a semantic description which leads to the problem of some relevant web services being left undiscovered. In this paper S. Naveen et al [26] have proposed an approach which emphasizes on the web service matching constructed on the semantic description of the web

services which is registered in the Universal Description Discovery and Integration (UDDI). They have enhanced the discovery of web services by this approach which uses the semantic information extracted from the service description document registered in the UDDI registry. UDDI registry is categorized based on the service functionalities in offline mode. The user suggestions are considered during the situations of unidentified domain.

23. *UDDI Rated Web Services*

There is great rise in the number of web services available and this is very much likely to expand even more. In this scenario, the selection of most relevant service based on their quality such as price, response time is very crucial. In this paper Sarith Divakar and K S Mathew [27] have identified publishing of service Qos information and the matching of Qos requirements as the key challenges and proposed a model for web services discovery. The proposed model contains three components namely: the UDDI registry, service consumer and the service provider. The UDDI registry contains certifying authority and the rating authority. The rating authority contain certain web services which are used to rate the certified web services. In case of static rating, weighted average is taken by assigning weight for each Qos parameter by rating authority. In case of dynamic rating, user can specify weight for each Qos parameters and based on that weighted average is taken. The consumer can now retrieve a web service which meets their functional and Qos requirements the most.

24. *A system for Web Service selection based on Qos*

The web service discovery process shall not only consider the functional needs of the user, but shall also consider some nonfunctional aspects. The current UDDI and search engines are built on key word based search mechanism which is not adequate for retrieving or discovering all the relevant web services. Divya Sachan et al [28] proposed a Qos mediator agent centered Web Service selection and Web Service registry model. In this model, the mediator agent chooses the list of matched services from the service pool and provides to the client each time a search is performed. Preferences to the Qos parameters are set and the highest ranked services are provided to the client. Two different Algorithms for service registry and service selection have been used. The system was developed using NETLOGO MYSQL database. The Qos database containing the core Qos parameter is processed by the NETLOGO MYSQL extension. In addition to the existing parameters such as availability, correctness and execution time, the proposed model also considers security, reliability, throughput, reputation etc.

25. *An intents-based approach for service discovery and integration*

Intent services are single topic and give more informative descriptions. The main goal of intents is to interconnect various services. Cheng Zheng et al [29] scrutinized the essentials of service discovery and integration applied in Intents. Architecture of Intents-based systems has been presented, and the advantages of Intents over other existing technologies have been conferred. There are currently two types of existing intent based systems: web intents and android intents. Intents are best suited for single parameter services.

26. *Google based Hybrid Approach for Discovering Services*

A major downside with the current WSDL and UDDI web service description standards is that they are limited with syntactic aspects of service which leads to burdensome discovery and matching of user requests. Shailja Sharma et al [30] proposed an approach that gives ranked list of services based on the web based relatedness score and supports the users in the selection of potentially relevant and semantically similar services within a category. All the services above a user specified threshold value are recognized as potential services. The input, output and text descriptions of the service profile are considered. A semantic kernel is built with its each vector representing the hybrid vector representation of the web services. This kernel takes in the user requests as inputs and returns potential services. A semantic feature relatedness matrix is created which semantic relevance corresponding to each category is recorded

27. *Web service discovery and Integration with QOS parameter using SOA based Repository*

An organization has diverse information required by several departments for coordination among themselves. Distributed web services are offered in a distributed system. A Qos based registry is introduced for improving the flexibility and scalability of the registries. Vinay Kumar Tiwari et al [31] have introduced a design and implementation of a UDDI with Qos parameter which helps in discovering quality web services using SOAP message. In the proposed architecture, a service provider registers with the repository and the service requestor enquires about services and its specifications. The SOA framework is connected with the UDDI registry and also adds or accesses information from it. The tmodel represents a technical specification explaining the web services as well as categorizes the register.

28. *Web Service Matchmaking Using a Hybrid of Signature and Specification Matching Methods*

Web services are generally searched or discovered from the registries through a match making process. Abidi et al [32] have implemented a hybrid web service match maker analyzing both the signature and specifications. At the signature level, logical similarity measures are applied to the services, input/output concepts and a Structure

Preserving Semantic Matching algorithm has been proposed for non-logical matching. For logical match making, logical filters proposed by Klusch are improved upon with a fine-grained logical matching approach that computes the degree of subsumption relation for each parameter separately for a pair of web services. A matching score with respect to the significance of the match is given ranging from 0 – 1. These matches are also categorized into exact match (value 1), plugin match (0.8), subsume match (0.7), subsumed-by match (0.6) and failed match (0). While, on the other hand, specification matching is done through short sentence matching technique. Web service textual descriptions are extracted from a service profile and parsed using the Stanford parser so as to extract the syntactic nature. Then the similarity between syntactic function for two different services is calculated.

29. *OWL-S Based Web Service Discovery in Distributed System*

Scalability is an issue with traditional centralized indexing scheme in large distributed systems. Lin Zhang [33] presented a service discovery model for building dynamic, scalable and decentralized registries with flexible search capabilities concentrating on a fully distributed architecture. A two layer P2P network topology has been proposed in which each service registry node is considered as a peer. An OWL-S based approach has been used to capture real world knowledge for semantic service annotation. An infrastructure of registries with high scalability for semantic publishing and web service discovery has been introduced. Also a translation strategy which maps inputs and outputs of the web services to the OWL-S ontological concepts is used as a technique for web service discovery

30. *Web Service selection based on Qos using tModel working on Feed forward network*

Aarti M. Karande and Dr. Dhananjay R. Kalbande [34] have introduced an approach for the selection of web services using tmodel of SOA which is designed using feed forward network. Feed forward neural networks are used for ontology matching as well as pattern matching. ANN based model is used which schema-level information and instance-level information inside the ontology domain. It contains two phases: a) training phase, in which the input parameters are set and b) matching phase in which fact testing policy is checked for RDF-triple to get output targets. tModel is built using the ANN matching model.

31. *A Method of UDDI Service Subscription Implementation*

Yue et al [35] have proposed an implementation method for the registry based on the analysis of information interaction mode and functional requirements of the subscription. Two methods namely: Real-time monitoring method and Polling method have been proposed for the realization of subscriptions. In the former method, we need to check whether there are services relating to subscriptions and send notifications accordingly. Based on this, a simple subscription instance of Association of Electronic Producers (AEP) is built. Implementation of subscription of the AEP involves publishing, monitoring, and getting subscriptions of AEP. In the latter, independent subscription services are to be developed.

32. *Quality of Experience*

Existing Web services selection and discovery approaches may depends on non – functional aspects called as Quality of service (Qos), using Qos one can find suitable services for selection and discovery but they fail to address the user viewpoint of quality.Bipin et al [36] Suggested Quality of Experience (QoE) attributes for selection and composition of Web services which integrates perceived quality from users view point. They have proposed a solution which mines automatically and Identifies QoE attributes from the web .Second they have made a study on the application of extracted QoE attributes used for service selection. The author's analysis results show that there is a possibility to identify QoE attributes automatically with a 92 percent of an average precession and around 80 percent of recall.

QoE attributes are extracted from online reviews based on the user experience and feedback. They have suggested that QoE attributes can be used for service selection when Qos data are not available in real time, further they have discovered the possibility of using user reviews for service selection.

IV. CONCLUSION

In this survey we have presented various approaches of web services discovery, each approach has its own advantages and its limitations.Intially the web service discovery was performed by key word based technique and further they have extended in to Similarity based, Semantic based, Search engine based and Nonfunctional based description methods. Web services discovery based on Qos is also drawing a major attention in web service discovery since large number of web services provide same Properties and retrieving the accurate web services is also a challenging task. Our survey concludes the various approaches of web service discovery and our proposed work focuses on efficient web services discovery with petite response time and to provide exact services to the user according to the user requirements.

REFERENCE

[1] Uddi Executive Overview: Enabling Service Oriented Architecture, 2004 Oct.
[2] "Web Services Architecture", http://www.w3.org/TR/ws-arch/. Date Accessed: 11/02/2004.
[3] UDDI V3 Specification. http://uddi.org/pubs/uddi-v3.00-published-20020719.html. 19/07/2002.
[4] Christensen E, Curbera F, Meredith G, Weerawarana S, Web Services Description Language (WSDL) 1.1, W3C Note, 2001
[5] Ali A S, Rana O F, Ali R A, Walker D W, UDDIe: an extended registry for Web services, SAINT-w'03 Proceedings of the 2003 Symposium on Applications and the Internet Workshops, 2003 Jan, pp .85-89.
[6] Tsai W T, Paul R, Cao Z, Yu L, Saimi A, Xiao B, Verification of Web Services Using an Enhanced UDDI Server ,Proceedings of The Eighth IEEE International Workshop on Object-Oriented Real-Time Dependable Systems ,2003 Jan, pp 131-38.
[7] Liu J, Gu N, Zong Y Ding Z, Zhang S, Zhang Q Service Registration and Discovery in a Domain-Oriented UDDI Registry , Proceedings of the 2005 The Fifth International Conference on Computer and Information Technology (CIT'05),2005, pp .276-83.
[8] Jian W, Zhaohui W, Similarity-based Web Service Matchmaking Proceedings of the 2005 IEEE International Conference on Services Computing (SCC'05), 2005.
[9] Tretola G, Zimeo E , Structure Matching for Enhancing UDDI Queries Results , IEEE International Conference on Service-Oriented Computing and Applications(SOCA'07),2007.
[10] Ayorak E, Bener a, Super Peer Web Service Discovery Architecture, IEEE Proceedings - International Conference on Data Engineering, 2007 pp .287-94.
[11] Libing He W, Wu Y, Jianqun D A novel interoperable model of distributed UDDI -proceedings of the 2008 IEEE International Conference on Networking, Architecture, and Storage - IEEE NAS 2008 Jun, pp .153-54.
[12] Nawaz F, Qadir K, Ahmad H F, and SEMREG-Pro: A Semantic based Registry for Proactive Web Service Discovery using Publish Subscribe Model, Fourth International Conference on Semantics, Knowledge and Grid, IEEE Xplore, 2008 Dec, pp .301-08.
[13] LIANG1 Q, CHUNG2 J A Federated UDDI System for Concurrent Access to Service Data, IEEE International Conference on e-Business Engineering, ICEBE'08 - Workshops: AiR'08, EM2I'08, SOAIC'08, SOKM'08, BIMA'08, and DKEEE'08, 2008 Oct, pp .71-78.
[14] Vandan T, Nirmal D, InderjeetGarg S, Garg N, Soni P. An Improved Discovery Engine for Efficient and Intelligent discovery of Web Service with publication facility, SERVICES 2009 - 5th 2009 World Congress on Services, 2009, pp .63-70.
[15] Ma C, Song M, Xu K, Zhang X.Web Service Discovery Research and Implementation Based on Semantic Search Engine, IEEE 2nd Symposium on Web Society, Beijing. 2010 Aug 16-17, pp .672-77.
[16] Rajendran T.Balasubramanie P, Flexible and Intelligent Architecture for Quality Based Web Service Discovery with an Agent- Based Approach, International Conference on Communication and Computational Intelligence (INCOCCI), Erode. 2010 Dec 27-29, pp .617-22.
[17] Johnsen F T, Hafsøe T, Eggen A, Griwodz C, Halvorsen P, Web Services Discovery across Heterogeneous Military Networks, IEEE Communications Magazine, 2010 Oct, 48(10), pp. 84-90.
[18] Ourania H, Georgios B, Mara N, Dimosthenis A, "A Specialized Search Engine for Web Service Discovery" IEEE 19th International Conference on Web Services,USA. 2012 June 24-29, pp. 448-55.
[19] Raj R J R, Sasipraba T., Web Service Recommendation Framework Using Qos Based Discovery and Ranking Process 3rd International Conference on Advanced Computing, ICoAC. Chennai. 2011Dec 14-16, pp .371-77.
[20] Ren X, Hou R, Extend UDDI Using Ontology for Automated Service Composition 2nd International Conferences on Mechanic Automation and Control Engineering, MACE, 2011 July, pp .298-301.
[21] Jaber K Walid C Khaled G, "Binding Web Services: an Optimizing Approach**"** Proceedings of the 2012 International Conference on Cloud Computing and Service Computing, CSC. Shanghai. 2012 Nov 22-24, pp .64-71.
[22] Jin J, An e-commerce UDDI model in P2P network environment International Conference on Information Management, Innovation Management and Industrial Engineering, Sanya. 2012 Oct 20-21, 3, pp .106-08.
[23] Zhou J, Zhang T, Meng H, Xiao L , Chen G, Li D, Web Service Discovery based on Keyword clustering and ontology , IEEE International Conference on Granular Computing, Hangzhou . 2008 Aug 26-28, pp. 844-48.
[24] Zhou B, i Huan T, Liu J, Shen M, "Using Inverted Indexing to Semantic WEB Service Discovery Search Model", 5th International Conference on Wireless Communications, Networking and Mobile computing, IEE Explore, 2009 Sept 24-26, pp .1-4.
[25] Khanam S A, Oh K H, Seol W S, Youn H Y A Novel Semantic Web Service Discovery Scheme Using Bipartite Graph IEEE International Conference on High Performance Computing and Communications & IEEE International Conference on Embedded and Ubiquitous Computing, Zhangjiajie .2013 Nov 13-15, pp. 1070-77.
[26] Kumar S, Pabitha P, Ahamed A K M , Web Service Discovery based on Semantic Description International Conference on Cloud & Ubiquitous Computing & Emerging Technologies ,2013,11(5), pp .1306-10.
[27] Divakar M S, Mathew KS, UDDI Rated Web Services Third International Conference on Advances in Computing and Communications, 2013Aug, pp .340-42.
[28] Divya S, Dixit, Kumar S, Kumar S A system for Web Service selection based on Qos International Conference on Information Systems and Computer Networks, Mathura. 2013 Mar 9-10, pp .139-44.
[29] Zheng C, Shen W, Hamada H. Ghenniwa, An Intents-based Approach for Service Discovery and Integration, IEEE 17th International Conference on Computer Supported Cooperative Work in Design, CSCWD. Whistler, BC. 2013 June 27-29, pp .207-12.
[30] Sharma S, Lather J D S, Dave M, Google based Hybrid Approach for Discovering Services IEEE 9th International Conference on Semantic Computing (IEEE ICSC 20 IS), Anaheim, CA .2015 Feb 7-9, pp. 498-502.
[31] Tiwari V K, Gautam A K, Diwaker S, Web service discovery and Integration with QOS parameter using SOA based Repository" International Conference on Advances in Computer Engineering and Applications (ICACEA), Ghaziabad . 2015 Mar 19-20, pp. 1014-1009.
[32] Raza A S, Ali D, Farrukh M S, Web Service Matchmaking Using a Hybrid of Signature and Specification Matching Methods IEEE/WIC/ACM International Joint Conferences on Web Intelligence (WI) and Intelligent Agent Technologies (IAT),2014 Aug, pp .266-73.
[33] Zhang L, OWL-S Based Web Service Discovery in Distributed System IEEE Workshop on Electronics, Computer and Applications, Ottawa, ON .2014 May 8-9, pp .882-85.
[34] Aarti M K , Web Service selection based on Qos using tModel working on Feed forward network" International Conference on Issues and Challenges in Intelligent Computing Techniques (ICICT), Ghaziabad .2014 Feb 7-8, pp .29-33.
[35] Dai, Feng Y, Zhao Y, A Method of UDDI Service Subscription Implementation Yuntao Software Engineering and Service Science (ICSESS), 5th IEEE International Conference, 2014 Jun 27-29, pp .661-66.
[36] Upadhyaya B, Zou Y, Keivanloo I, Ng J, Quality of Experience: User's Perception about Web Services, IEEE TRANSACTIONS ON SERVICE COMPUTING, 2015 Jan, 8 (3), pp .410-21.